THE LANCET

A Journal of British and Foreign Medicine, Surgery, Obstetrics, Physiology, Chemistry, Pharmacology, Public Health, and News.

Telegrams—LANCET, WESTRAND LONDON *Telephones*—GERRARD 4314 & 4315 *Offices*—423, Strand, London, W.C.2

No. XXV. OF VOL. II., 1923. **No. 5234. Vol. CCV.** LONDON, SATURDAY, DECEMBER 22, 1923. Founded 1823. Registered as a Newspaper. Published Weekly. **Pp. 104 - Price 1s.** Annual Subscription Inland £2 2s. Abroad £2 10s.

THE PRACTITIONER'S PRESENT. IN DAILY DEMAND.

NOW READY. 36s. net, postage 1s.

THE MEDICAL DIRECTORY, 1924.

"Thoroughly established in the esteem of the profession ..... as nearly perfect as a yearbook in this changing world can be."—B.M.J.
"A recognised classic throughout the world."—THE POLICY.
London: J. & A. Churchill, 7, Great Marlborough-street, W.1.

NOW READY. Crown 8vo. Pp. viii.+180. Price 7s. 6d. net (postage 6d.).

SURGICAL UROLOGY: AN INTRODUCTION TO

By WILLIAM KNOX IRWIN, M.D. Aberd., F.R.C.S. Edin., Hon. Cas. Out-Patient Surgeon, St. Paul's Hospital for Genito-Urinary Diseases, London, &c.

Baillière, Tindall & Cox, 8, Henrietta-street, London, W.C.2.

JUST OUT.

DISEASES OF THE RECTUM AND COLON AND THEIR SURGICAL TREATMENT.

BY
P. LOCKHART-MUMMERY,
F.R.C.S.ENG., M.A., M.B., B.C.CANTAB.,
Senior Surgeon to St. Mark's Hospital.

Over Two Hundred Plates and Illustrations. Price 25s.

Baillière, Tindall & Cox, 8, Henrietta-street, Covent Garden.

Fourth Edition. Crown 8vo. Pp. viii.+244. With 92 Illustrations and Folding Plate. Price 7s. 6d. net.

REFRACTION OF THE EYE.

By ERNEST CLARKE, M.D., F.R.C.S. Eng.
"One of the best, if not THE best, book on the subject in this or any other language."—EDINBURGH MEDICAL JOURNAL.
Baillière, Tindall & Cox, 8, Henrietta-st., Covent Garden, W.C.2.

PATHOLOGICA

1924—VOL. XVI.
Rivista di diffusione mondiale.
Una inesausta miniera di notizie.
Genoa Italy casella postale 884. Annual subscr. £1 8s.

BY CHARLES J. HEATH, F.R.C.S.,

Consulting Aurist, Metropolitan Asylums Board; late Surgeon, Throat Hospital, Golden Square, London.

OTITIS MEDIA (MASTOID DISEASE):
ITS SYMPTOMS, DIAGNOSIS, PROGNOSIS AND TREATMENT BY MODERN METHODS, thus saving the hearing of the discharging ear with perforated drumhead.
Price 5s. net.
"We have no hesitation in describing Heath's paper as epoch-making."—ST. BARTHOLOMEW'S HOSPITAL JOURNAL.
"This work is recommended to specialists and even to those who are not."—L'OTO RHINO LARYNGOLOGIA INTERNATIONALE.
Baillière, Tindall & Cox, 8, Henrietta Street, London, W.C.2.

H. K. LEWIS & CO. LTD.,

MEDICAL PUBLISHERS AND BOOKSELLERS.

MEDICAL AND SCIENTIFIC CIRCULATING LIBRARY.

CHRISTMAS HOLIDAYS, 1923.

All Departments will be closed on MONDAY, December 24th, to WEDNESDAY, December 26th inclusive.

London: 136 & 140, Gower Street, 24 & 28, Gower Place, W.C. 1.

Now Ready. Pp. xi.+269. With 3 Charts. 5s. net.

ON ALCOHOLISM: Its Clinical Aspects and Treatment.

By FRANCIS HARE, M.D., Medical Superintendent of the NORWOOD SANATORIUM, Beckenham.
"Marked by candour, common sense, and moderation.....likely to become the standard text-book."—BRITISH MEDICAL JOURNAL.
London: J. & A. Churchill, 7, Great Marlborough-street.

SYPHILIS AND VENEREAL DISEASES.

By C. F. MARSHALL, M.Sc., M.D., F.R.C.S.Eng.; and E. G. FFRENCH, M.D., F.R.C.S. Edin., M.R.C.P. Lond., Lieut.-Col. R.A.M.C. (Ret.), late O.C. Military Hospital, Rochester Row, S.W.
Fourth Edition, revised and illustrated with 7 Coloured Plates and numerous Figures. Price 15s.
London: Baillière, Tindall & Cox, 8, Henrietta-st., Covent Garden.

By H. D. GILLIES, C.B.E., F.R.C.S.,
Plastic Surgeon, Queen's Hospital, Sidcup; Prince of Wales' Hospital, London, N.; and St. Andrew's Hospital, Dollis Hill, London.

PLASTIC SURGERY OF THE FACE.

424 pages. 844 Illustrations. Price £3 3s.

Oxford Medical Publications,
The *Lancet* Building, 1, Bedford-street, Strand, London, W.C.2.

WISE PARENTHOOD.

THE HANDBOOK ON BIRTH CONTROL FOR MARRIED PEOPLE.

By MARIE STOPES, D.Sc., Ph.D.,
Author of "Married Love," "Radiant Motherhood," "Contraception," etc.

11th Edition, Revised and Enlarged. 3s. 6d. net (post 3d.).

WISE PARENTHOOD is specially suited for Doctors to recommend to enquiring patients. Written in clear non-technical language, it meets the æsthetic difficulties while at the same time giving practical and scientific advice to all those who are interested in the subject.

Descriptive circulars of this and Dr. Stopes's other books can be had on application.

G. P. Putnam's Sons, Ltd., 24, Bedford-street, W.C.2.

Just Issued. New (5th) Edition.

Todd's Clinical Diagnosis

Just Issued. New (5th) Edition.

This new (5th) edition is virtually a new book—largely rewritten, endless new material added, and despite a page containing 25 per cent. more matter than formerly, an increase in size of some 75 pages. *Blood chemistry* is only *one* of the many new things added. Others are Rosenthal's modification of the phenoltetrachlorphthalein test for liver function, flocculation test, permutite method for ammonia in urine, typing pneumococci, and many more. An Index-Outline, arranged alphabetically according to diseases, gives the page on which will be found the high points necessary in making laboratory diagnostic tests for certain diseases.

Octavo of 762 pages, with 325 Illustrations, 29 in colours. By JAMES CAMPBELL TODD, M.D., Professor of Clinical Pathology, University of Colorado. Cloth, 28s. net,

Books sent, Carriage Paid, on Receipt of Price.

W. B. Saunders Company, Ltd., 9, *Henrietta Street, London, W.C.2.*

ATOPHAN
Schering
The sovereign remedy for GOUT, RHEUMATISM, NEURALGIA.

Schering

VERAMON
Schering
The new analgesic of increased efficacy.

Chemische Fabrik auf Actien (vorm. E. SCHERING) Berlin.

Obtainable from all Wholesale and Retail Chemists and Druggists and Druggists' Sundries Houses.

FOR LITERATURE AND SAMPLES APPLY TO—

A. & M. ZIMMERMANN, Ltd., Lloyds Avenue, London, E.C. 3.

USE LESLIES' ZŌPLA (ZINC OXIDE PLASTER)
A PERFECT STRAPPING

ZŌPLA is tenaciously Self-adhesive, will not slip, will stand any strain imposed on it, is Antiseptic, and is absolutely Non-irritating. The Sale is steadily growing. British made.

Supplied on white and Flesh-colour Cloths, also on Holland, on Spools ½" to 4", 5 or 10 yard lengths, in rolls 7" and 12" wide. Also on moleskin, chamois leather, felts, and waterproof cloth. **SAMPLES ON REQUEST.**

ZŌPLA is made by the firm with the reputation for BROWN HOLLAND STRAPPING (Original make). [Telephone—Walthamstow 686

LESLIES LTD., High Street, Walthamstow, LONDON, E.17

VALENTINE'S PREPARATION
NUTRIO VERUM
MEAT JUICE.
The result of an original Process of Preparing Meat, and extracting its Juice by which the elements of nutrition are obtained in a state, ready for immediate absorption.
DIRECTIONS-Dissolve one teaspoonful of the Preparation in two or three tablespoonfuls of cold or warm water. The use of boiling water changes the character of the preparation.

Valentine's Meat-Juice

In **Hospital** and **Private Practice** and **in their own persons** when ill, **Physicians** have **demonstrated** the **power** of **Valentine's Meat-Juice** to **Sustain** and **Strengthen** the weakened **Vital Forces** when the **Digestive Organs** are **Impaired.**

Debility, Exhaustion, and Anæmia.

Dr. Julian Calleja, *Pres. Royal Academy of Medicine of Madrid, Spain:* "It is with the greatest satisfaction that I inform you that I consider VALENTINE'S Preparation of MEAT-JUICE to be of a very superior order for invigorating the nervous system, for which I use it myself and prescribe it to my patients."

Ross H. Skillern, M.D., *Laryngologist Rush Hospital for Consumption, Philadelphia, Pa.:* "I, myself, had the misfortune to be seized with an attack of Cerebro Spinal Meningitis and after a critical illness recovered. My mainstay during the attack was VALENTINE'S MEAT-JUICE, and I can assure it materially aided in my recovery."

For sale by European and American Chemists and Druggists.

VALENTINE'S MEAT-JUICE COMPANY,
RICHMOND, VIRGINIA, U.S.A.

D 5

THE LANCET

No. 5234. LONDON, SATURDAY, DECEMBER 22, 1923. Vol. CCV.

CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT.

AN ADDRESS on the Chronic Dyspepsias of Women. By A. J. WALTON, M.S., F.R.C.S. —(*Illustrated*) 1333

ORIGINAL ARTICLES.

The Thyroid Apparatus in Man. By G. SCOTT WILLIAMSON, *M.C.*, M.B.—(*Illustrated*) 1337

On Immuno-transfusion. By LEONARD COLEBROOK, M.B., B.S., and E. J. STORER, M.R.C.S. —(*To be Concluded*)... 1341

On the Use of Opium in Cardiac Dyspnœa. By CLAUDE WILSON, M.D. 1345

CLINICAL AND LABORATORY NOTES.

The Temperature of the Skin over Lipomata. By HAROLD BURROWS, C.B.E., F.R.C.S. 1347

A Case of Rupture of the Heart. By J. KNOX THOMPSON, M.B., B.Ch. 1347

MEDICAL SOCIETIES.

Royal Society of Medicine: Chronic Abdominal Pain in Nervous Women..... 1347

Section of Orthopædics: Myositis Ossificans Traumatica 1350

Medical Society for the Study of Venereal Disease: The Working of Venereal Centres ... 1352

Edinburgh Medico-Chirurgical Society 1353

Brighton and Sussex Medico-Chirurgical Society 1354

REVIEWS AND NOTICES OF BOOKS.

Treatment of Fractures in General Practice. By C. Max Page, D.S.O., M.S., F.R.C.S., and W. Rowley Bristow, M.B.: B.S., F.R.C.S. 1355

L'Hématoblaste, Troisième Elément du Sang. By Georges Hayem and Dr. L. Rivet 1355

The Infant and Young Child. By John Lovett Morse, A.M., M.D.; Edwin T. Wyman, M.D.; and Lewis Webb Hill, M.D. 1355

How our Bodies are Made. By R. M. Wilson, M.B., Ch.B. 1356

Applied Pathology in Diseases of the Nose, Throat, and Ear. By Joseph C. Beck, M.D., F.A.C.S. 1356

Die Digitalis und ihre therapeutische Anwendung. German translation by Prof. Dr. P. Neukirch 1356

Medical Climatology of England and Wales. By Edgar Hawkins, M.A., M.D. 1356

The Old Doctor. By Frank G. Layton, M.R.C.S., L.R.C.P. ... 1357

Quarterly Journal of Experimental Physiology 1357

The Indian Journal of Medical Research 1358

REPORTS AND ANALYTICAL RECORDS.

Alunozal.—"Soloid" Aluminium Sulphide.—Bismuthyl, Bi-quinyl, and Injectable Urenile. —Salicin 1358

LEADING ARTICLES.

CANCER RESEARCH..... 1359

A GREAT SEER 1360

SPA TREATMENT AND DIURESIS 1361

MEDICINE IN HOLLAND . 1361

ANNOTATIONS.

The Prevalence of Influenza 1362

Ætiology of Blackwater Fever 1362

A Pioneer of Public Health 1362

Sickle-cell Anæmia 1363

Chronic Tonsillitis and Puerperal Sepsis—(*Illustrated*) 1363

X Ray Effects on Tissue Cultures 1364

Traumatic Myositis Ossificans 1364

Bitemporal Contraction of the Fields of Vision in Pregnancy 1364

The V.A.D.'s 1365

Tubercle Bacilli in the Urine 1365

Price and Unit Value of Insulin 1366

Treatment of Melæna Neonatorum 1366

MODERN TECHNIQUE IN TREATMENT.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

L.—The Treatment of Epistaxis. By J. GAY FRENCH, M.S., F.R.C.S. 1367

SPECIAL ARTICLES.

Imperial Cancer Research Fund: Scientific Report 1368

Some Common Mountain Ailments, and How to Combat Them. By BERNARD HUDSON, M.D., M.R.C.P..... 1371

Holland: The Medical Profession in Holland. —The Panel Doctor. —Sodoku (Rat-bite Disease) 1372

Notes from India: Suggestions for Organised Research.—Pasteur Institute for Calcutta . 1373

British Provident Association for Hospital and Additional Services ... 1373

The Middlesex Hospital Conversazione 1381

THE SERVICES.

Royal Naval Medical Service.—Royal Army Medical Corps.—Royal Air Force 1373

PUBLIC HEALTH SERVICES.

Reports of Medical Officers of Health: Chester.—Oldham.—Great Yarmouth.—Walsall.—Darlington.—Nuneaton Dover.—Llanelly.—Macclesfield.—Gravesend.—Chelmsford.—Stretford.—Weston-super-Mare 1374

CORRESPONDENCE.

On Some Uses of Digitalis (Dr. Harrington Sainsbury) 1376

The Prevention of Bilharziasis (Dr. F. G. Cawston) 1376

The Medical Examination of Motor Drivers (Dr. R. T. Williamson)..... 1377

OBITUARY.

Prof. Robert Tigerstedt —(*With Portrait*) 1377

George Pester Chappel, M.D. 1377

Sydney Stephenson, M.B., C.M., F.R.C.S. 1378

Robert Walmsley Fisher, M.D., B.Ch., D.P.H... 1378

MEDICAL NEWS.

University of Oxford ... 1379

Royal College of Surgeons of England 1379

University of London: University College 1379

University of Liverpool.. 1379

Royal Sussex County Hospital 1344

Fourth Northern General Hospital, Lincoln 1354

Penalty for Improper Charges to Panel Patients 1375

Presentation to Prof. Alexis Thomson 1378

Small-pox in England and Wales 1380

Remuneration of Insurance Practitioners 1380

Manchester Hospitals ... 1380

Royal College of Physicians of Edinburgh 1380

Bethlem Royal Hospital. 1380

Royal Medical Benevolent Fund 1380

National Hospital for the Paralysed and Epileptic 1380

The late Lord Willoughby de Broke 1380

The National Health Insurance Act in the Irish Free State 1380

Donations and Bequests . 1381

NOTES, COMMENTS, AND ABSTRACTS.

On the Humanity of Methods of Slaughter. By LEONARD HILL, M.B., F.R.S. 1382

Quo Vadimus? 1384

A New Cancer Cure—(*Illustrated*) 1384

Wright's Improved Physicians' and Surgeons' Visiting List, 1924 1384

Appointments 1381

Vacancies..... 1381

Births, Marriages, Deaths 138

Medical Diary 1384

CLINICAL SURGICAL DIAGNOSIS. For Students and Practitioners. By F. DE QUERVAIN, *Professor of Surgery and Director of the Surgical Clinic at the University of Basle.* Translated from the Seventh Edition by **J. SNOWMAN,** M.D., M.R.C.P. Third English Edition, with 731 illustrations and 7 coloured plates. Royal 8vo, 50s. net, postage 1s.

SURGERY OF THE LUNG. By **C. GARRÉ** and **H. QUINCKE.** Translated from the German by DAVID M. BARCROFT, M.D. Second Edition. With 114 coloured and other illustrations and 2 coloured plates. Royal 8vo, 12s. 6d. net, postage 9d.

ON FACIAL NEURALGIA AND ITS TREATMENT. By **J. HUTCHINSON,** F.R.C.S., *Consulting Surgeon to the London Hospital.* With especial reference to the Surgery of the Fifth Nerve and the Gasserian Ganglion. Second Edition. 37 illustrations. Demy 8vo, reduced to 7s. 6d. net, postage 9d.

ARTHROMETRY, OR THE MEASUREMENT OF THE MOVEMENTS OF JOINTS. Being Notes for showing the Mobility of Injured Limbs by means of an Arthrometer. By **W. WILBRAHAM FALCONER.** Foreword by R. FORTESCUE FOX, M.D. Demy 8vo, 2s. 6d. net, postage 6d.

Record Cards for the above, 12s. 6d. net per 100, postage 9d.

JOHN BALE, SONS & DANIELSSON, Ltd., 83-91, Great Titchfield Street, London, W.1.

Third Edition. Revised. Cr. 8vo, 1000 pp. **21s.** *net; postage 9d.*

SYNOPSIS OF
MEDICINE

By **H. LETHEBY TIDY,** M.A., M.D.Oxon., F.R.C.P.Lond.,

Asst. Physician, St. Thomas's Hospital; Physician, Royal Northern Hospital.

"An admirable *index medicus*...Dr. Tidy is to be congratulated on having written a good book and given it a good index."—BRITISH MEDICAL JOURNAL.

"We can say without hesitation that the book is far ahead of any medical synopsis that it has been our lot to encounter."—THE LANCET.

Second Edition. Revised and Enlarged. Illustrated. Demy 8vo. **8s.** *net.; postage 5d.*

ELECTRIC IONIZATION

A Practical Introduction to its Use in Medicine and Surgery.

By **A. R. FRIEL,** M.A., M.D., F.R.C.S.I.,

Clinical Asst., Throat and Ear Dept., Royal Free Hospital, &c.

"Well set out and can be recommended."—BRITISH MEDICAL JOURNAL.

"A useful and practical guide to the subject."—THE LANCET.

Sixth Edition. Cr. 8vo, 628 pp. Revised. Numerous Diagrams. **17s. 6d.** *net; postage 9d.*

SYNOPSIS OF
SURGERY

By **E. W. HEY GROVES,** M.S., M.D., B.Sc.Lond., F.R.C.S.Eng.,

Surgeon to the Bristol General Hospital; Examiner in Surgery, University of London, &c.

"Complete in its range of subjects..... among the best of its kind."—BRITISH MEDICAL JOURNAL.

"This synopsis of Surgery has had a wide sale, which has necessitated the issue of frequent editions, and it deserves thoroughly all the success it has attained."—THE LANCET.

London: SIMPKIN & CO. Ltd. **Bristol: JOHN WRIGHT & SONS Ltd.**

Works by Sir Charles A. Ballance, K.C.M.G., etc.

A GLIMPSE INTO THE HISTORY OF THE SURGERY OF THE BRAIN. 10s. 6d. net.

ESSAYS ON THE SURGERY OF THE TEMPORAL BONE. £7 7s. net.

THE SURGERY OF THE HEART. 10s. 6d. net.

Macmillan and Co.

Price 1s. With Illustrations.

APPLICATION OF TRUSSES

to HERNIÆ. Clinical Lecture delivered at King's College Hospital. By the late JOHN WOOD, F.R.S., Senior Surgeon to King's College Hospital. Reprinted from "Medical Examiner."

London: Matthews Brothers, 10, New Oxford Street, W.C.

Just Published. Price **5s.** net. (Postage 4d.)

WHY BE FAT?

By **CECIL WEBB-JOHNSON,** M.B., Ch.B.

(Author of "Twilight Sleep," "Diet for Women," "Diet for Men," etc.)

A small handbook on the causes, prevention, symptoms and treatment of obesity. Suitable for general practitioners, medical students and sufferers from obesity.

London: MILLS & BOON, 49, Rupert Street, W.

STAMMERING

W. J. KETLEY, "Tarrangower," Brondesbury, N.W.

30 years colleague of late B. BEASLEY, Brampton Park, Huntingdon.

Those interested in the subject should write for his book, which will be sent post free.

STAMMERING, SPEECH DEFECTS, VOICE TRAINING.

BEHNKE METHOD. Est. 1882.

Carried on by Miss BEHNKE, at 39, Earl's Court-square, S.W.5.

Cases also received into residence, summer holidays, at Miss Behnke's house in the country. Early application necessary.

"Pre-eminent success in the education and treatment of stammering and other speech defects."—*The Times.*

"Thoroughly physiological principles."—*The Lancet.*

"The method is scientifically correct and perfectly effective."—*Guy's Hospital Gazette.*

From a Harley Street Specialist.—"The condition is to a great extent a psychical one, and the admirable results obtained by yourself and your parents have in my opinion been to a great extent due to your personal psychical influence over your subjects. You are at liberty to use this expression of my opinion." (*This letter may be seen.*)

"Stammering: Cleft Palate Speech: Lisping." 3s. 9d. post free.

Of Miss BEHNKE, 39, Earl's Court-square, S.W.5.

DR. CHAUMIER'S GLYCERINATED AND REINFORCED CALF LYMPH

THE CHEAPEST AND MOST ACTIVE LYMPH.

PREPARED UNDER THE MOST MINUTE ANTISEPTIC PRECAUTIONS.

Supplied in Tubes, sufficient to vaccinate 1 or 2 persons, at 8d. each; 10 persons at 1s. 3d. each, 25 persons at 2s. 3d. each. Collapsible tubes for 40 vaccinations 3s. 9d. each. Postage and packing 2d. each extra.

ROBERTS & CO., 76, New Bond St., LONDON, W.

DISPENSING BOTTLES

MEDICAL FLATS, VIALS, POISONS, ETC.

Good Quality, Accurate Measure
at
LOWEST REDUCED PRICES
Prompt attention to Country Orders

OLDEST BOTTLE HOUSE IN THE TRADE
ESTABLISHED 100 YEARS

I. ISAACS & CO.

NORTH LONDON GLASS BOTTLE COMPANY

London Office: 106, MIDLAND ROAD N.W. 1.

Warehouse and Stores: London, Midland & Scottish Railway Goods Depot, St Pancras.

Telephone: Museum 4209. *Telegrams:* Isaglasbot, Kincross, London.

VACCINES

AUTOGENOUS AND STOCK

In bulk or in graduated doses.

Apply SECRETARY,

LABORATORIES OF PATHOLOGY & PUBLIC HEALTH

6, HARLEY STREET, LONDON, W.1.

CULTURE MEDIA.

Freshly Prepared and Standardised Weekly.

In Tube or in Bulk.

Apply

LABORATORIES OF PATHOLOGY & PUBLIC HEALTH
6, HARLEY STREET, LONDON, W.1.

REAGENTS FOR WASSERMANN REACTION

STANDARDISED and supplied in Ampoules, Ready for Use.

AS USED IN THESE LABORATORIES.

For Prices and particulars apply to SECRETARY,

LABORATORIES OF PATHOLOGY & PUBLIC HEALTH
6, HARLEY STREET, W.1.

An Address

ON THE

CHRONIC DYSPEPSIAS OF WOMEN.

Delivered at the Annual Meeting of the Norfolk and Norwich Medico-Chirurgical Society.

BY A. J. WALTON, M.S. LOND., F.R.C.S. ENG.,
SURGEON, LONDON HOSPITAL.

IT is becoming more and more evident that the estimation of surgical skill is to be based rather upon the surgeon's knowledge of the type of case on which to operate than upon his method of operating. Almost anyone can, with a little practice, become sufficiently expert to perform complicated operations, but only those who have had wide experience and training can determine when such an operation should be carried out. Nearly all modern disasters of surgery are due not so much to errors of technique as to the fact that a certain operation is performed on the wrong type of patient. If asked what is the type of case which to-day gives me the greatest difficulty in making up my mind whether or not to operate, I have a ready answer. The greater part of my consulting practice is made up of patients, often women, who are suffering from chronic dyspepsia, generally of many years standing, the symptoms of which do not actually fit in with those of any organic disease of the stomach, duodenum, gall-bladder, or pancreas, and yet superficially resemble these conditions. They have also often had a long course of medical treatment with little or no benefit. Two questions at once present themselves: Are such patients suffering from an organic lesion as well as their chronic dyspepsia; and if it be certain that they have no organic lesion, should they be treated by operation? These questions are to-day enormously exercising the medical profession; large numbers of these cases are seen by all surgeons who are doing much work on the abdomen. As I have been for many years devoting considerable attention to this question, and have had an opportunity of watching the results of many forms of treatment in a well-equipped follow-up department, I have arrived at certain conclusions here published. These conclusions, however, are not yet fixed, and it is quite possible that in a few years' time they may alter considerably.

A TYPICAL CASE OF CHRONIC DYSPEPSIA.

I will first describe a typical example of such a case, one which will be widely recognised. The patient, usually a woman between the ages of 20 and 30, seeks advice for long-continued dyspepsia, which, on careful questioning, is found to date back to between the ages of 12 and 15. She will usually state that this has been continuous, but often there are intervals of two or three days' relative freedom. Even during these periods she will have to exercise care in her diet or the symptoms will return. In later years they have progressed and become much more severe, until she is no longer able to lead a normal life, to take a natural diet, or to perform her usual duties. Her chief complaint will be of severe pain, usually commencing in the epigastrium and passing round to the back. It is increased by food and usually comes on shortly after the ingestion of a meal, so that not only has she modified her diet considerably, but in many cases has cut it down to a minimum and has therefore lost considerable weight. As a general rule the pain is increased by exercise, is worse at the end of the day, and is sometimes relieved by lying down. In the more severe attacks it is associated with frequent vomiting, and the patient will not uncommonly state that she vomits everything that she takes; this is manifestly an exaggeration, for the patient may be in good condition, not showing the evidences of profound wasting and collapse which would be the accompaniment of such symptoms. The appetite is poor, and, in fact, the patient frequently has an entire distaste for food. At times there may be attacks of sharp hæmatemesis with the vomiting, which will considerably strengthen the belief that a gastric ulcer is present. Constipation is usually a marked feature, so that the majority of such patients habitually take aperients. Physical examination will reveal certain characteristics which will help in the diagnosis.

PATHOLOGY OF THE CONDITION.

Although such is a very common example of the type of case under discussion there are others in whom the symptoms differ considerably, so that the resemblance will not be so close a one to that of gastric ulcer as to that of chronic appendicitis or to gall-stones. The severity of the pain, the long-continued symptoms, and the general deterioration in the health of these patients has in the past led many of them to be subjected to operative treatment, and to the astonishment of the surgeons no definite organic lesion has been discovered. The enormous amount of work which has recently been done upon this type of case has now, however, shown very clearly that there is a very definite pathology. This is widespread in its effects and is shown by (1) localised abnormalities in the intestinal tract, (2) changes in the general body structure, (3) alterations in the nervous system. It must be clearly understood, however, that the extent of these different changes varies very considerably, and only by a careful consideration of them all can one arrive at a correct diagnosis. I propose very briefly to consider them one by one.

LOCALISED CHANGES IN THE INTESTINAL TRACT.

Although perhaps not of the greatest importance, the presence of localised changes in the intestinal tract gives rise to the symptoms we are considering.

FIG. 1.

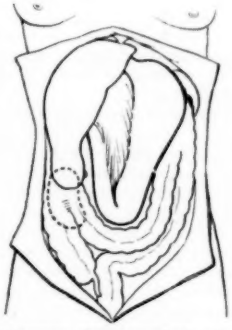
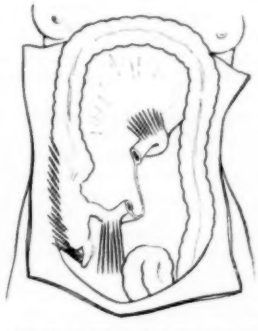


Diagram showing ptosis of the viscera.

FIG. 2.



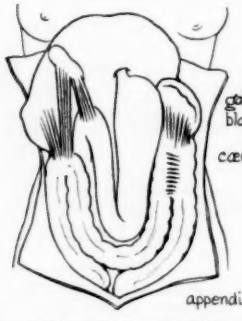
Lane's kink, Jackson's membrane, and the mesocolic fold.

The first most constant change is one of abnormal mobility and general dropping of the viscera. (Fig. 1.) The stomach and transverse colon are low, the cæcum is displaced downwards and freely movable and has a long mesentery. The right kidney passes down with the cæcum, to which it is generally adherent. The liver is low and rotates to the right, and often shows secondary changes in its contour. The uterus is retroverted and prolapsed, and the coils of the small intestine are sunk low into the pelvis. Although both increased mobility and ptosis are always found in patients with these symptoms, the former may be unexpectedly found at an operation for some other condition, and may give rise to no symptoms; even a profound degree of ptosis may be present and cause the patient no inconvenience. I have seen a large number of cases, some of them indeed my own personal friends, upon whom an operation for some acute condition such as appendicitis disclosed a freely

mobile and low cæcum and transverse colon, and yet in after-life no further symptoms have developed.

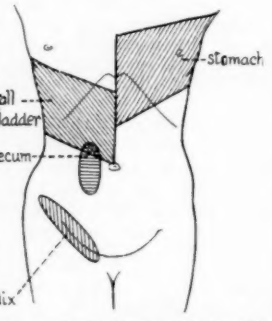
The second change is the presence of abnormal bands and membranes, usually most marked in the situation where the long mesenteries are evident. The nature of these membranes and bands are shown diagrammatically in the illustrations I present. There is a thin membranous sheet (usually described as Jackson's membrane) passing from the outer side of the cæcum and ascending colon to the right parietal wall and often upwards to the liver. There is a band on the under surface of the mesentery of the lower ileum trying this latter structure, in a small part of its course, down to the posterior abdominal wall and causing a kink of the ileum known as Lane's kink. (Fig. 2.) There is a membranous band, passing from the under surface of the mesocolon to the first few inches of the jejunum, known as the mesocolic fold. From the gall-bladder run membranes passing to the duodenum and to the hepatic flexure, known respectively as the cystico-duodenal and cystico-colic folds. There are thickened bands passing from the splenic flexure to the spleen and across from the distal end of the transverse colon to the first part of the descending colon, binding these two structures together and kinking them. (Fig. 3.) There is yet a further membrane, known as Toldt's membrane, which lies on

FIG. 3.



The cystico-colic and duodenal folds and Payr's membrane.

FIG. 4.



Areas of hyperæsthesia with visceral disease.

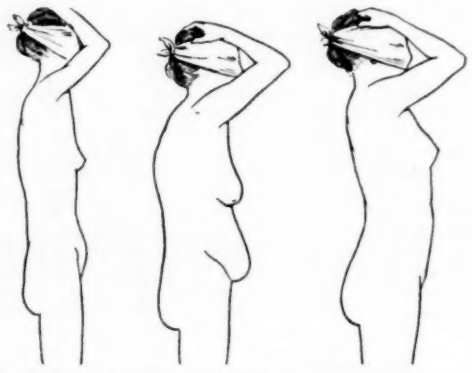
the outer side of the pelvic colon and binds it down to the left iliac fossa.

As with the case of the ptosis, these membranes and bands are often accidentally found and have given rise to no symptoms. It has been shown to my own mind conclusively that they are present in quite young children and may even be found in the fœtus, so that they must be regarded as congenital in nature. It is, however, when such membranes and bands are found in association with ptosis that symptoms begin to appear. In the later stages there is evidence of dilatation, of atony, and sometimes indeed of inflammatory changes in the walls of the intestine, especially in those of the cæcum and colon.

CHANGES IN GENERAL BODY STRUCTURE AND IN MENTALITY.

The changes in general body structure are often distinctive, and are divided into two groups known as virginal and maternal ptosis. The virginal type is very characteristic, and I have represented its most marked changes in Fig. 5. The patient is thin, sometimes wasted, she appears to be relatively tall, the tissues are soft and relaxed, and the whole body is poorly developed. These changes are sometimes evident even in quite young children, although they become more distinctive after the age of puberty. The thorax is narrow and shallow from before backwards. The lower ribs slant rapidly downwards, and there is a narrow epigastric angle. The shoulders are bent, the dorsal curve is exaggerated, and the lumbar curve absent. The upper abdomen is narrow and the waist long; the pelvis appears too wide for the body. The condition may be associated with flat-feet, "genu valgum," and sometimes with scoliosis. At times this change shows a distinct hereditary tendency. The second or maternal type (Fig. 6) is a patient who may have wide shoulders and a well-developed thorax and upper abdomen but the abdominal walls are soft and flabby owing to the patient's having had many children, and all the viscera have been allowed to

FIG. 5. FIG. 6. FIG. 7.



Virginal ptosis. Maternal ptosis. Ideal female type.

drop. The lumbar curve may have disappeared and the shoulders may have become rounded.

The changes in the nervous system, or rather in the mentality of these patients, are well known; owing to them a diagnosis of hysteria is frequently made. The changes consist chiefly of a lack of interest in their surroundings, of an abnormal concentration of their attention upon their symptoms, and, in fact, of a general melancholia. I have pointed out that changes in the body structure are often little in evidence, and the same is true of the mental changes. The description given above applies to an advanced case, but it cannot be too clearly realised that some of the patients with well-defined symptoms are apparently bright and healthy girls, with normal body structure, whose ptosis and intestinal changes are only recognised at operation or on X ray investigation; sometimes, indeed, these patients are good athletes, and in such the greater difficulty will arise in making a correct diagnosis.

ÆTIOLOGY.

Before we consider the question of symptoms and treatment it will be necessary for me very briefly to discuss the ætiology of this condition. As you are all aware, there has been an enormous amount of theoretical discussion as to which is the primary factor. I have on many occasions discussed the evidence in favour of one or other of the views advanced, and will here simply state my own views as to the cause of the condition, and the evidence in support of these views. The mobility of the intestines, which is due to the presence of long mesenteries, is manifestly congenital, and the amount of mobility varies considerably in practically all people. If a series of normal people be investigated by the X rays the cæcum is usually lower in females than in males, but even in such normal people 50 per cent. or more may show viscera so low that symptoms would be expected to occur, and yet they have never been in evidence. The membranes and bands I also firmly believe are congenital in origin, and are not due to any reactionary change that attempts to overcome the mobility. They have been found on many occasions in quite young infants, and even in the fœtus at term. I believe that they are as common as the increased mobility, and, in fact, I have never yet seen a case with abnormally long mesenteries which has not shown some or other membrane formation. It therefore appears to me perfectly

clear that a very high percentage of the human race, perhaps even indeed 50 per cent., have viscera which show a mobility and an excess in membrane formation which is usually regarded as abnormal.

Any theory to be satisfactory will have to explain why such a condition is so much more common in the female sex, for it is agreed by all observers that at least 80 per cent. of the patients are females. Although many of us may not believe in the equality of the sexes, we cannot seriously contend that woman is so much lower in the evolutionary scale that she tends to maintain the viscera of the quadruped. My own experience has shown clearly that the mobility and membrane formation is as common in males as in females; there must therefore be some other factor which makes the symptoms more common in women. This in many cases is manifestly the change in the body structure. Although a hereditary factor is sometimes found, there is as a rule in quite young children no difference between the body structure of the boys and girls. This change must therefore largely be acquired. Now it is found that these cases are much more common in women who have an unsuitable environment. It is more common in those who from an early age have to earn their own living, who have had to work for prolonged hours, often in insanitary surroundings and with little or no open-air exercise, and it is under exactly such conditions that a poor body structure would be expected to develop, leading in time to the changes in the vertebræ and thorax; it will be seen how much more likely these changes are to occur in those who show a faulty hereditary muscular tone. In the maternal type the factor is somewhat different. There is not the general loss of muscular tone, but there is the destruction of the support of the abdominal muscles and the loss of the lumbar curve.

This view will, however, still leave unexplained that group of cases where definite symptoms occur in apparently normal and well-developed women and men who have capacious upper abdomens and a well-shaped thorax. Sherrington has, however, supplied the explanation for this variety. He has shown clearly that there are two distinct groups of muscular activity, the one concerned with voluntary movements and the other with posture. Postural activity is characterised by the fact that it can be maintained for prolonged periods without fatigue. It is acquired in early life and is apparently largely the result of training. At first the various postures of the body can only be maintained by voluntary effort which is tiring and irksome, but later it becomes unconscious and can be maintained for long periods. The large number of people who were drilled in the recent war will realise how a correct stance is at first difficult to maintain, but later becomes automatic and unconscious. Now it has been recognised by many observers that many of the more athletic girls of to-day have an extremely poor carriage. They have, perhaps, developed their voluntary muscles to an extreme degree, but have entirely neglected their postural activities. Hence, although sturdy and apparently well-developed, they may have little or no tone in their abdominal or lumbar muscles, so that their viscera are allowed to drop. Moreover, loss of muscular tone is dependent upon mental fatigue, and hence is much more likely to occur in those people who have a poor mental capacity; thus it would seem that the mental changes so commonly found in these people are to a large extent primary, and that they are people who are less likely to make the mental efforts necessary to overcome their physical disabilities. In the later stages it is probable that the long continuation of their symptoms exaggerates their mental changes. It would thus seem that both increased mobility and membrane and band formation are congenital changes, which, after all, are of no importance, which exist equally in the male and female and which give rise to no symptoms; but it is the supervention of a poor muscular tone and a badly-shaped body which will allow these freely mobile viscera to drop, to become kinked, and in turn to be rendered atonic. I believe that this view is the only one which will explain the much greater frequency of this condition in women, and the fact that mobility and membrane formation is often found in patients who have little or no symptoms. It is also realised that in some of the most advanced cases of maternal ptosis no symptoms at all may be found. In such cases operation will reveal the fact that there is no membrane and band formation.

SYMPTOMS.

It is manifest that if one viscera or one portion of the intestinal tract be more mobile or more kinked than another symptoms may be mainly directed to that portion, and thus it is that these cases come to us with a superficial resemblance to a gastric or duodenal ulcer, to gall-stones, or to appendicitis; but there are many characteristics common to all which will help to distinguish the case from one of these organic lesions. With the exception of the less common maternal type—and the relatively rare variety, starting in men about the age of 40, which may therefore resemble carcinoma of the stomach—there is, as a rule, a long history which dates back to the time the patient was at school. The patient will describe how during this long period there have been definite attacks, but careful investigation will show that she has never been perfectly free between; this fact alone will give rise to the suspicion of the underlying cause, being very different from the clear periodicity which is so evident with a gastric or duodenal ulcer. The attacks themselves are usually short, persisting as a rule only for a few days, and followed by a period of relative freedom which is often of short duration and rarely exceeds one or two weeks. Moreover, the attacks, if progressive in their severity, are only so to a very slight degree, and thus differ considerably from the attacks found with a chronic appendicitis. It is a difficult thing to visualise any pathological process within the appendix which could recur some 15 or 16 times and yet never would have led to an abscess or severe inflammatory change.

The pain is often described as "severe," but since our judgment of its severity is based on the patient's statement it is difficult to determine its degree; it is, however, manifestly not so disabling as the severe pain of an ulcer or of a gall-stone colic. It is frequently wide and diffused over the abdomen, although its point of greatest severity may be in the epigastrium in the gastric cases, or in the right iliac fossa in the pseudo-appendix cases. In the former it will not have the same definite relationship to food as with a gastric ulcer, or if made worse by food the increase will be noted almost as soon as the food is ingested. Another characteristic fact is that it is usually better in the morning and increases as the day goes on, generally to be relieved again when the patient lies down in bed. This dependance upon the patient's position, although not absolutely constant, is usually a marked feature, and one of my patients—an intelligent woman—had learned to stand on her head during her severe attacks and gained almost immediate relief thereby. In a similar way it is frequently noted that after a tiring or exhausting day the symptoms are more manifest. In the right iliac fossa, again, it is often noted that there is an exacerbation with each menstrual period, probably owing to the increased congestion of the pelvic viscera, and it is probably for this reason that so many of these patients have been operated upon for ovarian trouble.

The vomiting is generally a marked feature, much more so than in the case of an organic lesion. It is often present several times in the day, and in the younger women especially may continue for two or three weeks at a time. It is such conditions which are often diagnosed as chronic gastric ulcer; but it must be remembered that gastric ulcer cases usually only vomit in occasional attacks, and even if they do so the vomiting is rarely severe. The nature of this symptom is also sometimes helpful in the diagnosis of acute

appendicitis, for in this condition a patient, as a rule, only vomits once at the onset of an attack. The act of vomiting often gives little or no relief, such as it does with gastric lesions other than carcinoma.

Hæmatemesis is a frequent symptom in the gastric type, especially in the younger women. In my own experience some 50 per cent. of the cases have had a sharp loss of blood at some time or other in the course of their disease. The loss of blood is manifestly due to the supervention of small gastric erosions in a dropped stomach. The appetite nearly always shows a characteristic change. There is a very definite loss during the attack, and this may indeed be as marked as the change which is seen in cases of carcinoma. Generally, however, there will have been the long history of many years attacks with severe loss of appetite in each. Even between the acute attacks the appetite is capricious; the patient will often state that she has little or no desire to eat, and that she has to be careful in the choice of diet lest severe symptoms be induced. Constipation is a frequent concomitant, and in fact many observers regard this as the primary cause. The majority of such patients will state that they rarely have a movement of the bowels without some aperient, but some will state that they are better when the bowels are freely moved, others that they are not so well. It must be remembered here that in the long-standing cases, where the stasis is advanced, there may be diarrhœa instead of constipation, owing to the onset of colitis from the previous stagnation.

In addition to these general symptoms the patients will often state that they have a feeling of general malaise, of lack of interest in their occupation, and of general inertia. In fact, it is a very frequent thing to find young women presenting no physical signs of any gross disease who have been unable to carry out any employment, or indeed to lead a life other than that of a semi-invalid, for many years.

On physical examination the types vary enormously. An extreme case will show the typical changes of mental depression, the characteristic features of the "ptosis habitus," and evidences of dilated and dropped viscera. Such conditions can hardly be overlooked if their possibility is remembered, but it is in the more intelligent type of patient who has a better physical development that difficulties in diagnosis are more manifest. In them a careful outlook will have to be maintained for the presence of positive physical signs. It is well to remember that unless there are complications a patient with gastric or duodenal ulcer or gallstones will show little or nothing beyond a localised area of deep tenderness. A patient with ptosis, although perhaps having a well-shaped abdomen, will generally manifest evidence of loss of tone, so that in the erect posture there will be a sinking-in of the upper abdomen and a protrusion of the lower portion. Not infrequently definite areas of hyperæsthesia give a clue to the correct diagnosis, and Fig. 4 shows the areas of hyperæsthesia associated with gastric dilatation or acute ulceration, and of dilatation of the cæcum, which are to be contrasted with those of a dilated and diseased gall-bladder or appendix. A chronic gastric or duodenal ulcer is never associated with areas of hyperæsthesia. On abdominal palpation the deep tenderness in a case of ptosis is more widely diffused, corresponding either to the whole area of the stomach or cæcum or being manifest over the whole lower abdomen. The dilated stomach and cæcum are frequently palpable, for distinct splashing may be obtained over either viscus on palpation. Attention should always be directed to the right kidney, which is often abnormally mobile. The examination of the test-meal is often of little value, for although in the majority of cases both free hydrochloric acid and total acid are much diminished, in some cases they are well above normal and may indeed be as high as those found in a duodenal ulcer. X ray examination, if conducted by one well skilled in this branch of work, is often of value. There will be the absence of the positive signs of a gastric or duodenal ulcer, the stomach, the colon, and the cæcum will frequently be abnormally low, and, what is perhaps of more importance, they will show a definite delay in emptying. It must be remembered that this delay is often associated with abnormally active movements, so that irregular areas of spasm and contraction are seen, but they do not empty the viscus. General constitutional changes, to which Sir Arbuthnot Lane has directed so much attention, such as a sallow complexion, foul breath, chronic mastitis, and areas of pigmentation, are usually only seen in late and advanced cases when the diagnosis presents little if any difficulty.

TREATMENT.

It is well to remember that the primary treatment of this condition is essentially medical. The congenital factors of abnormally long mesenteries and membrane formation, although an important part of the disease, will give rise to no symptoms unless the loss of muscular tone be superadded. Such loss of tone with its consequent alteration in the body structure cannot be overcome by operative treatment. Often, indeed, it is so advanced that even a complete alteration in the patient's manner of life and the most careful medical treatment will fail to overcome the established deformities. The essential fault to remedy, however, is the carrying out of surgical treatment in the belief that a definite organic lesion is present. The details of medical treatment which should be carried out in these cases I shall not enter into here, but they will always be prolonged and tedious, and will include careful attention to physical exercises combined with rest, general hygiene, dieting, and medical treatment. Since the patient's condition of life is such that she often can give neither the time nor the money for such a course of treatment, it is manifest how difficult is the cure. Only after such a course of medical treatment should any question of operative interference be considered. A large number of operative measures have been put forward from time to time as a cure for this distressing complaint, but the value of every one has in the past been grossly exaggerated; one has only to remember how widespread are the changes to realise that any form of operation will fail to overcome them all, and it must therefore be clearly understood by the physician or surgeon—and should, indeed, be explained to the patient—that any form of operation can at best give partial relief, and will have later to be combined with medical treatment. In other words, if the medical treatment alone has failed, an operation may be added in order to make that medical treatment more successful.

The next factor on which personally I lay great stress when deciding to operate is the localisation of symptoms. If these are diffuse, if there is much mental change and a poor body structure, it is evident that any operative treatment that hopes to be successful would have to include a widening of the lower thorax, a restoration of the lumbar curve, a fixation of all the affected viscera, and a return of the muscle tone. Such an operation is, of course, impossible, and the best results, therefore, are likely to accrue when one viscus is not alone at fault but is the only one sufficiently abnormal to give rise to symptoms. Thus, if the patient complains almost wholly of gastric symptoms, attention can be directed to this viscus with every hope of amelioration, and the same is true with right-sided symptoms limited to the cæcum and ascending colon, but it must be clearly realised that claims which have been made that the mobility of one viscus is the cause of the widespread symptoms are incorrect. No primary mobility of the cæcum could possibly give rise to the secondary mental changes and dropping of the transverse colon and stomach, or to the increased length of the pelvic mesentery. It is also manifestly incorrect that a mobile cæcum is the cause of chronic gastric and duodenal ulcer, for all observers are agreed that although ptosis is a very common condition, and is often mistaken for these lesions, it is but rarely found associated with them. Ptosis is a disease of relatively young women, gastric and duodenal ulcers are much more common in adult men.

The actual steps in treatment will be two-fold. Any obstruction of the viscus from kinking by bands or membranes will have to be overcome. This may be accomplished by division of the bands, or in some cases, as in chronic duodenal ileus, an anastomosis will be necessary. Remember, however, that a gastro-enterostomy for a dropped stomach is almost certain to be unsatisfactory, probably because the tone of the gastric muscle is much below normal. When all the kinks and obstructions are overcome it will be necessary to fix the dropped viscus. The technical methods of performing such a step I shall not enter into to-day, but the fixation should be such that it interferes as little as possible with the motility of the viscus and causes little or no deformity. The viscera to which such fixation has been most successful are the right kidney, the cæcum and ascending colon, the stomach, and the transverse colon, but my own experience has been that a measure of relief is only afforded if the symptoms are almost wholly limited to one or other of these viscera, and even when such an operation has been performed medical treatment must be carefully continued, and the conditions of life of these patients, which preclude the possibility of adequate exercises, will often necessitate the use of some abdominal binder or support.

Resection of some portion of the intestinal tract, whether of the cæcum alone or of the whole colon, is tending to have a more and more limited field; like many other surgeons, I find that I am performing this operation very infrequently. In my opinion, it should be limited to extreme cases in which the colon is not only low, but also very atonic. It is an operation which is associated with a considerable mortality, and therefore it will not often be justified as a form of treatment for a condition which, although very disabling, does not in itself lead to the death of the patient.

THE THYROID APPARATUS IN MAN.*

BY G. SCOTT WILLIAMSON, *M.C.*, M.B., CH.B. EDIN.

(From the Department of Pathology, Royal Free Hospital, London.)

THE first application of the recently published work on the structure and physiology of the thyroid gland is to review the integration of the various organs associated with the thyroid gland function. Launoy [1] has very completely reviewed the facts in favour of considering the thymus, thyroid, and parathyroid, not merely as associated structures, but as one functional apparatus. Critical examination of material from 2000 post-mortems affords considerable substantiation of the point and perhaps affords a guide to the specific function of the apparatus.

Anatomical Features of the Thyroid Apparatus.

The Thyroid Organ.—The thyroid organ consists of two compact lateral lobes. The upper pole of each lobe is marked off by a constriction below which lies the bulk of the lobe. Immediately below this constriction a band of thyroid tissue projects across the middle line from each lobe to form an isthmus, or from each side it extends up the neck along the line of the thyro-glossal duct to form a pyramidal lobe or lobes. The lobes of the gland have no capsule proper; they lie in a special compartment of the fascia of the neck. This fascial compartment is usually shut off from the mediastinum on each side by a fibrous tissue diaphragm. Each lobe has a hilus, where the loose fascia dips into the gland substance to become the interstitial tissue of the organ. The hilus lies posteriorly on the mesial surface of each lobe under cover of the base of the isthmus or pyramidal lobe. The large inferior thyroid artery enters the lobe at the lower end of the hilus, and the smaller superior thyroid artery at the upper end, these arteries are usually united by a communicating vessel that occupies the length of the hilus. Only small venæ comites emerge from the lobe at the hilus. The veins and lymphatics emerge at the surface of the lobes and unite in the loose fascia to form a plexus of veins and lymphatics which is continuous in the fascial compartment with a similar plexus from the thymus. The vascular supply within the lobes is characterised by a considerable capillary anastomosis between arteries and veins in the interstitial tissue of the lobe, providing, as it were, a short circuit, before the very specialised capillaries of the functional unit are given off. (Kidney and liver present a similar arrangement.) Certain anomalies in the gross anatomy must be noted. Accessory lobes are a frequent occurrence, most commonly at the lower pole of the lobe. An accessory lobe may lie in the mediastinum beyond the fibrous diaphragm. The upper pole may constitute one of these accessory lobes. The compact gland may give place to a multilobar gland, the small independent lobes being scattered in the fascial plane from the hyoid bone to the root of the great vessels in the mediastinum, there being no fibrous tissue diaphragm separating the thyroid and thymus tissue. The isthmic tissue may be absent on one or both sides. The arteries are the subject of great variation. The superior artery may be the larger or the only vessel, or may be absent. Very frequently both arteries break up on entering the fascial compartment into numerous branches, which enter the hilus independently, so that neither superior nor inferior thyroid can be recognised in the hilus. (Fig. 1.)

Microscopic Anatomy of Thyroid.[2]—The lobes of the thyroid organ are divided up by interstitial tissue septæ into lobules. The lobules consist of a collection of gland units having a specific structure. Each gland unit is enclosed in a fibro-elastic tissue capsule, giving support to the endothelium of a lymphatic sinusoid, which is an expansion of the intralobular lymphatics. Within the sinusoid lie coiled columns of epithelium. The columns of epithelium are surrounded by a peculiar ladder-like plexus of capillaries, their walls of endothelium are unsupported by any fibrous tissue. These capillaries emerge at two or three points, penetrate the endothelium of the sinusoid, and become the intralobular vessels—artery and vein being indistinguishable within the limit of the lobule.

Thyroid Epithelium.—The appearances presented by this epithelium will vary with the phase of physiological activity. The architecture of the epithelium is seen only in the indifferent phase. In this phase the epithelium, seen in section, corresponds to the "interfollicular tissue" of the literature, about which controversy has raged. The existence of a system of micro-capillaries in the substance of the epithelial column [3] serves to distinguish it from parathyroid tissue and to identify it with the general body of the gland in the other phases of activity. In this phase the column of epithelium seems solid. The central zone of the column is demarcated by the system of micro-capillaries. The central core of the zone contains a homogeneous protoplasm continuous through the mesh of the micro-capillary system with the protoplasm of the periphery. The nuclei lie in a central position near the closed mesh of the micro-capillary system. The epithelium has all the appearance of a syncytium, and contains no colloid, no secretion, and there is no granular matter in its protoplasm. The opaque areas to which particular attention has been called[3] may be made up of epithelium in this phase.

Parathyroid Bodies.—The parathyroid bodies, two in number, lie at the upper and lower ends of the hilus in each lobe, in close association with the superior and inferior thyroid arteries. They are bean-shaped bodies, having a soft, almost diffluent consistency. In the cadaver they are pigmented bodies often

* Assisted by a grant from the Medical Research Council.

indistinguishable from the pigmented fat in which they lie. In life, neither the pigment nor the fat with which they are associated is obvious. They are not to be confused with the special lymphatic glands that also constantly occupy the region of the hilus. Each parathyroid body draws its arterial supply from the associated thyroid artery. The venous return drains into a specially large vein, which joins the plexus on the surface of the thyroid gland. A considerable branch from the sympathetic is lost in the substance of each parathyroid body. Anomalies in the structure and distribution of the parathyroid bodies are common; there is, however, a definite relation between them and certain anomalies already noted in the thyroid. They each vary in size with similar variations in the size of their associated superior and inferior arteries. When there is only one artery entering the hilus of the lobe, there is only one parathyroid body, proportionately larger in size. When the arteries break up and enter the thyroid gland as independent twigs, there is no macroscopic evidence of a formed parathyroid body; microscopically, the tissue is spread out over the extent of the hilus. In the multilobar state of the thyroid no parathyroid tissue is to be found. When there is a single large parathyroid, the branch from the sympathetic trunk is a very obvious macroscopic structure, and is seen to end in the substance of the large body.

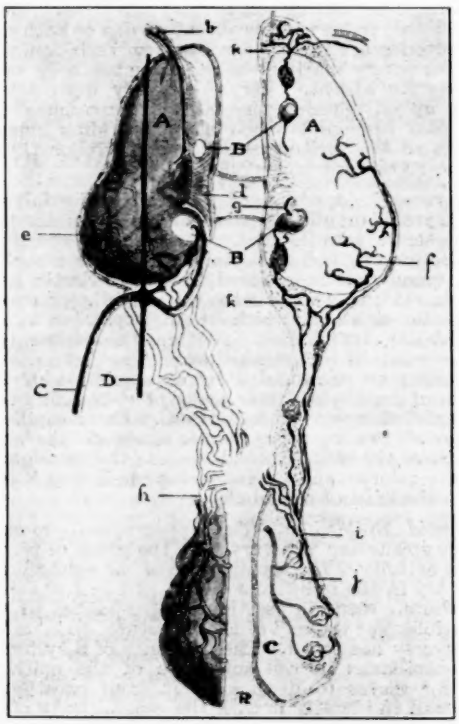


FIG. 1.—Schematic drawing of the thyroid apparatus.

A, thyroid gland: (a) hilus, (b) superior thyroid artery with parathyroid branch, (c) inferior thyroid with branch to parathyroid body, (d) intercommunicating artery, (e) capsular veins, (f) capsular lymphatic plexus.
B, parathyroid bodies: (g) ancillary lymphatic.
C, thymus: (h) venous plexus, (i) afferent lymph channels, (j) thymic lymph nodes, (k) superior and inferior (thymic) lymph-fat-gland bodies.
D, sympathetic trunk with parathyroid branch.

Microscopic Anatomy of Parathyroid Bodies.—The parathyroid bodies are composed of a series of systems of tubes. The tubes usually appear as columns of cells generally cubical in shape. The first part of their course is more or less radial. Centrally, they are coiled and convoluted, and when empty their appearance suggests a sponge work. Fibrous tissue accompanies the radial portion of the tubes, but only the capillaries penetrate to the central spongy zone. The lining cells of the tubes are subtended by a reticulum of large granular polygonal cells. Nerve fibres run in this reticulum. Granules of refractile, yellow-brown pigment occupy the clear cytoplasm of the cells lining the tube; this is more abundant, as a rule, in the radial portion of the tube. Certain anomalies are of interest. The body may be divided up by fibrous tissue septæ, so that there is no discernible s ongy centre, each member of the series of systems of tubes being more or less a separate entity. Frequently the systems that compose the body occur scattered independently through the fatty tissue in the hilus of the gland, the compact nature of the body being lost; this occurs when the thyroid arteries enter the hilus as a congerie of branches. The degree of scattering that occurs in the multilobar thyroid may explain the inability to find parathyroid tissue.

The Thymus.—The thymus lies in a special fascial compartment in the mediastinum, separated from the thyroid compartment by a fibrous diaphragm. It is composed of two leaves of tissue, each with a central branched stalk of fibrous tissue. In the fibrous tissue stalk and its branches run numerous arteries which end as glomerular tufts. About the glomerular tufts lie the reticulum cells of the thymus tissue. The blood leaves the gland at its surface by numerous veins which join the venous plexus of the thyroid gland. Large lymphatics run with the veins and form a plexus continuous with that of the thyroid gland. There are numerous lymphatic glands at the root of the neck within the thyroid-thymus fascial compartment associated with this plexus. In a generalised pigmentation of the deep and superficial cervical, the mediastinal and bronchial lymph glands, this system of lymphatic vessels and glands escapes pigmentation; it is, in fact, peculiar to the thyroid and thymus. The characteristic Hassall corpuscles lie in the fibrous tissue stalk or in its branches; they seem unconnected with the thymic reticulum, and are the only vestigial tissue in the thymus. Thymic tissue proper does not atrophy, but undergoes a very characteristic metatrophy. The lymph glands and fat in the hilus of the thyroid lobe present certain peculiarities. The lymph gland has no capsule, so that its reticulum is apparently continuous with that of the reticular mesh containing the fat. The colour of the fat varies with the colour of the thymic fat. As a rare occurrence this lymph-fat-gland tissue contains concentric bodies having the characters of Hassall corpuscles. This applies also to other lymph-fat-gland tissue encountered at the upper and lower pole of the thyroid lobe, each of them being constant structures. These appear to be part of the special lymphatic system more or less peculiar to the thyroid apparatus. This is often very strikingly brought out, in cases where the whole of the lymph glands of the neck, deep and superficial, are deeply stained with carbon-pigment. The glands of the thyroid apparatus remain as definite flesh-coloured structures devoid of pigment. This also applies to the thymic lymph-fat-gland tissue. The writer is of the opinion that these lymph-fat-gland bodies are essentially thymus tissue.

Anomalies.—The fibrous tissue diaphragm is commonly drawn up as a funicular extension attached to the lower pole of the thyroid lobe; in this lie the lymphatic plexus and lymph glands. The fascial compartment of the thymus is very frequently common to thymus and thyroid. Thymus tissue may be encountered anywhere within the compass of distribution of thyroid tissue in its anomalies. That applies not only to the endothelioid element but to the Hassall corpuscle element. In the multilobar form of thyroid the thymus and thyroid are inextricably mixed up. We have encountered an entire absence of medastinal thymus with hypertrophy of the neck nodes. The branches of the fibrous stalk may penetrate to the surface of the gland and isolate each glomerulo-reticular zone, resulting in the thymus appearing as a

collection of discrete units not unlike a bunch of grapes. (Fig. 2.)

Physiological Features of the Thyroid Apparatus.

The architecture of the thyroid apparatus, as set out above, is modified in quite definite directions by the furniture of physiological occupation. In the thyroid gland two cycles of operation present themselves: (1) a secretory phase; (2) a vesicular colloid

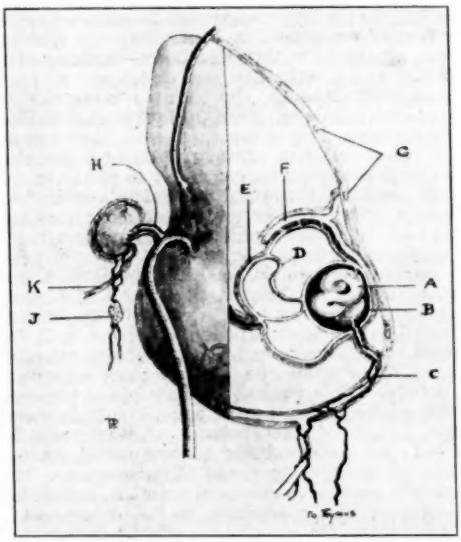


FIG. 2.—Schematic drawing of thyroid mechanism showing its connexions.

A, epithelial unit lying in B, the lymph sinusoid, draining into C, capsular lymphatics; D, arterio-venous vascular supply arising from E, interlobular artery which communicates with F, the interlobular vein, which empties into G, the capsular plexus; H, ancillary lymph channels emerging from the hilus to enter I, the parathyroid body from which they emerge and enter J, lymph-fat-gland tissue (? thymus); K, branch from sympathetic.

phase. Neither can change over to the other without passing through the indifferent phase already noted.

The Secretory Phase in the Thyroid Gland.—This is an active process in which the epithelium, the sinusoid, and all the endothelium of the gland units participate. In all its stages it gives the opaque appearance on macroscopic inspection that is also a feature of the indifferent phase. The details of this process of secretion are set forth in the original communication, from which the following summary is taken. The sequence of events is: (1) the opening up of the potential space of the lymphatic sinusoid by fluid matter; (2) a change in the endothelial cells lining the sinusoid associated with which lymphocytes appear in the intralobular lymph channels, and frequently also in the sinusoidal space; (3) swelling of the epithelium, migration of the nuclei to the extreme periphery, and the appearance of two orders of granules; (4) vacuolation of the protoplasm and partial solution of the granular matter in the fluid of the vacuoles; (5) lacunation of the epithelium by the accumulation of the contents of the vacuoles in the central core of the column of epithelium; (6) the tubules in the protoplasm of the epithelium appear to swell and conduct granular fluid; the radial branches become quite turgid.

Changes in the parathyroid bodies are definitely related to the nature and quantity of the secretory phase in the thyroid gland. The commonest condition is associated with the presence of fluid matter in the sinusoids of the thyroid gland during the course of secretory activity. The fluid matter (not colloid) can be traced directly to the tubes of the parathyroid bodies, giving to these structures a pseudo-vesicular appearance which has led to the confusing of thyroid and parathyroid tissue. One other feature of active secretion, more particularly associated with its lacunar phase, is the aggregation of lymphocytes in the sinusoids and lymphatic channels. These also overflow into the parathyroid bodies—so much so that they can completely obscure the architecture of the bodies. The lymphocytes are found, not only in the lumen of the tubes, but also in the inter-tubal tissue among the polygonal cells. These changes are proportionate to the amount of activity in the thyroid gland. The secretory activity of the thyroid gland is as intimately associated with changes in the thymus. Any increase in the secretory activity is invariably associated with an increase in the quantity of the lymphocytic element in the thymus; any decrease is associated with fat accumulation at the expense of lymphocytes. In favourable cases the fluid which we have seen in the sinusoid during activity in the thyroid gland can be traced, almost in continuity, to the lymph channels in the surface of the organ, and from thence through the plexus to the thymus. Little pools of this fluid are often found in the thymus tissue. Active changes in the endothelial element of the thymus are associated with the accumulation of lymphocytes in the tissue. It is possible to gauge the stage of secretory activity in the thyroid by studying the relation of lymphocytic accumulation in the thymus and in normal individuals the reverse is also true (this last does not hold in certain pathological states). As the lymphocytic change appears, the stored fat disappears, and there is evidence that the fat is actually used in the making of the lymphocytes—the change in the thymus from a fat to a lymphoid organ is, in fact, a metatrophy and not an atrophy, and it is the prevalence of secretory activity in the thyroid gland which determines this in health. The secretory phase in the thyroid gland is a most variable quantity. In fœtal life it is present to some degree in the midst of the indifferent tissue. In infancy it definitely increases in amount and continues to do so to about 9 years of age, and from that age remains stationary in quantity up to puberty; after puberty it increases, but not in any degree of disproportion, since the whole gland hypertrophies in a balanced manner—secretory, vesicular, and indifferent tissue in mutual relationship; after 18 to 20 years it diminishes in amount and colloid increases in amount. It cannot be sufficiently emphasised, however, that this age variation in the quantity of secretory activity is large, and difficult to estimate because each individual seems to be a law unto himself as regards the degree to which he depends on secretory activity of the gland. Further, it is very probable that each individual has seasonal as well as decadal variations. Nevertheless, the above facts stand out in an analysis of 2000 cases with considerable emphasis.

Response of Thyroid Apparatus to Age Variations.

The whole apparatus responds to these variations; thus the thymus would begin as a mixture of fat and lymphoid in the fœtus, and gradually acquire more lymphoid element at the expense of the fat up to 9 to 10 years, thereafter remaining stationary to puberty. With the hypertrophy of the thyroid and the consequent increase of secretory activity the lymphoid element would increase and the fat disappear, but without any actual increase in the bulk of the organ. When, on the other hand, the individual shows little increase in secretory activity and much colloid storage, the fat tends to disappear as well as the lymphoid tissue. At 18 to 20, when the thyroid is set as a nearly pure colloid storage, again fat perceptibly increases in the thymus, and this increase again is more related to the extent of the decrease in secretory activity than to the actual colloid storage.

In general disease, I am of opinion that the variations seen are no greater than those encountered in health. Rupert Farrant's [4] study of the thyroid gland in acute specific fevers becomes therefore a description of the very protean nature of the gland encountered in children of the fever age. Certain specific diseases still further emphasise this relationship of thyroid and thymus. Secretory activity is linked up to the lymphoid states, such as acute lymphatic leukæmia (in children), myasthenia gravis, certain intestinal lymphoid hypertrophies extraordinarily common in

infants and children, either generalised in lymph-nodes or focal, as at the appendix and pyloric antrum, and in persistent thymus and status lymphaticus. In all these states a pathological degree of secretory activity is evident in the thyroid gland.

In other conditions in which the thyroid gland shows secretory activity—as in eclampsia, status epilepticus, rickets, and the adenoid state in children—the lymphatic tissue, including the tonsils and lymphatic glands, shows a loss, often complete, of any lymphocytic activity. The thymus in these states is a simple endothelioid organ without fat and without lymphocytes—exhaustion best describes the condition. In a few cases of diabetes this condition of affairs also prevails. It is only necessary to recall the fact that a considerable school of observers look upon exophthalmic goitre as a thymic disease to emphasise the inter-relation of these two organs in that heterotrophic state in the thyroid gland.

Vesicular Colloid Phase in the Thyroid Gland.—The summary of this phase is taken from the original paper, and is as follows: (1) Vesiculation occurs in definite areas of the epithelial columns of the gland-unit; (2) vesiculation leads to the fragmentation of the columns into discrete spheroidal vesicles; (3) vesiculation is not accompanied by any demonstrable biochemical disturbance of the nuclei or protoplasm of the epithelium; (4) the gland-unit passively suffers distension and distortion to the extent of losing its identity under the process.

In the normal individual stored colloid varies inversely with the secretory activity in the gland up to a point. This is not invariably so, for in marasmus colloid disappears without any increase in secretory activity—i.e., there is a reversal towards the fœtal state in the gland. Thymic fat does not necessarily disappear in these conditions, but there is no increase in the lymphoid element. Even in children and young adults, vesicular goitre is associated with a fat-laden thymus, and this may have some specific significance. For the rest, stored colloid is almost a measure of thyroid inactivity, but so long as metabolism has a maintenance value secretory activity does not follow colloid depletion.

Conclusions.

The thyroid gland, the parathyroid bodies, and the thymus are intimately related anatomically, physiologically, and pathologically. They constitute an apparatus probably engaged in the conduct of some specific function. The thyroid gland is the main organ. The parathyroid is a sentinel gland of neuro-lymphatic nature, set in the course of the effluent, probably engaged in measuring the efficiency of the thyroid gland, and through the sympathetic nervous system adjusting its operation to the needs of the body. In the experience of the writer, certain pathological conditions of the kidney—or renal apparatus—indicate a similar relationship between the kidney and suprarenal body—the term neurotrodal gland would indicate the significance of such structures on the analogy of the electrode.

The thymus is a reservoir for the effluent—which, according to its nature is stored either as fat or in the lymphocytes. This must not be taken to imply a movement of lymphocytes into the blood or lymph; the probability is that they are manufactured in situ, and absorbed in situ. (See also Cramer's work on the possible significance of the blood platelets.[5])

The fact that colloid usually disappears to give place to any secretory activity, and the fact that it need not be so associated as in marasmus and in early fœtal active glands, make it probable that the colloid is exercising some vehicular function analogous to some of the constituents of bile. It is only passively concerned in the operation of the thyroid apparatus.

The most important feature of these conclusions is the implication of the lymphocytes in the operation of the thyroid apparatus. It presents the most promising line of investigating the function of this apparatus. Indeed, I approached the whole problem from a study of the inter-relation of purin-creatin and amino-acid nitrogen in intestinal disease of children, and was led from that to the heterotrophic lymphoid conditions, local and general, and through them to the thyroid gland.

Certain preliminary chemical studies—more particularly directed to the problem of the ætiology of gastric ulcer[6] and appendicitis—fix upon nitrogen carriage as the significant function of the lymphocyte, and this from the point of view not so much of total nitrogen as of the nature of the nitrogen (nucleoprotein, purin, amino-acid, peptide), so that the writer is working on the hypothesis that the thyroid apparatus is primarily concerned in controlling the direction of protein synthesis within the body—making it either a synthesis of plastic nitrogen, or trophic nitrogen, as the case may demand, the thymus being the reserve store of such nitrogen. Even the fat phase in the thymus yields nitrogen values for the tissue that are significant. Jackson[7] has already published observations which implicate secretory activity in the thyroid with protein metabolism, and Noel Paton's work,[8] looked at from a point of view not so exclusively endocrine, would have the same significance if lymphocytes, being the nitrogen carriers, varied their nitrogen partition from purin to non-purin according to need. Cramer's[9] work, and that of Cramer, Drew, and Mottram[10] on the lymphocyte, may have a similar significance.

Experimental work in this direction will further demand that some note be taken of the excretion of nitrogen other than the end-products of completed katabolism. This probably takes place through the gonads, making them, as it were, the kidneys of the plastic phase of metabolism, through which are excreted the end-products of completed anabolism. Protein metabolism (perhaps all metabolism) being a completely reversible chemical reaction, katabolism at the one end and anabolism at the other end, each implying complete catathesis of the substrate, the excreted end-products differing with the *direction* of the reaction.

A consideration of the significance of the conclusions in experimental ablation of the various parts of the thyroid apparatus is necessary. Clearly the effect of ablation may depend largely upon the relation of the individual to the secretory activity of the thyroid. This is the most variable feature of the gland. Thus it becomes necessary to postulate that in any experiments of that nature it will be necessary to reduce the individual to a definite dependency on secretory activity in the thyroid gland. Jackson and Mellanby's[11] work points to a means of achieving this, so that it may become possible to reconcile the contradictions which are the only striking results to date from experiments of this nature. The same criticism applies to the various thyroid extracts. Any extract of an average normal gland will largely consist of colloid extractives plus any constant peculiar to thyroid tissue, and the most variable quantity of traces of an active secretion. Here, also, it will be necessary to consider the thyroid gland as a resting organ in the indifferent phase, as a colloid storage organ, and as a secretory gland, and each of these in the lymphoid, fat, and exhausted stage of the thymic store, before we can hope to solve the problem of any autocoid activity the apparatus may possess.

References.

1. Launoy, L.: L'Appareil Thyroïde, Parathyroïde, Thymus, 1914.
2. Williamson, G. S., and Pearse, I. H.: The Structure of the Thyroid Organ in Man, Jour. Path. and Bact., 1923, xxvi.
3. Williamson, G. S., and Pearse, I. H.: A System of Tubules in Secreting Epithelium, Jour. of Anat., 1923, lvii.
4. Farrant, R.: Pathological Changes of the Thyroid in Disease, Brit. Med. Jour., 1914, i., 427, 470.
5. Cramer, W., and Drew, A. H.: The Effect of Light on the Organism, Brit. Jour. Exp. Path., 1923, iv., No. 5, p. 271.
6. Lansdowne, J. R. P., and Williamson, G. S.: Ætiology of Gastric Ulcer and Appendicitis, Brit. Jour. Surg., July, 1914.
7. Jackson, C. M.: Amer. Jour. of Anat., 1916, xix., 305.
8. Paton, Noel: Quar. Jour. of Phys., 1916, x., p. 315.
9. Cramer, W.: Glandular Adipose Tissue, &c., Brit. Jour. Exp. Path., 1920, i., 184.
10. Cramer, W., Drew, A. H., and Mottram, J. C.: Function of the Lymphocyte and Lymphocytic Tissue in Nutrition, THE LANCET, 1921, ii., 1202.
11. Mellanby, E. and M.: Jour. Phys., 1921, lv., 7.

ON IMMUNO-TRANSFUSION.

BY LEONARD COLEBROOK, M.B., B.S. LOND.,
ASSISTANT, BACTERIOLOGICAL DEPARTMENT, MEDICAL RESEARCH COUNCIL;
AND
E. J. STORER, M.R.C.S.,
ASSISTANT, INOCULATION DEPARTMENT, ST. MARY'S HOSPITAL, LONDON.
(*From the Inoculation Department, St. Mary's Hospital.*)

IN the course of a lecture on the treatment of infected war wounds[1] in 1919, Sir Almroth Wright advocated the transfusion, in certain cases, of immunised blood. This procedure, to which he applied the term "Immuno-transfusion" affords a last resource, he said, for patients suffering from septicæmia, when all that the surgeon can do has been done and when no response can be obtained to the inoculation of vaccines. He did not advocate simple transfusion because he had found that the normal blood-fluids contained, as a rule, less protective substances than those of the infected patient. As a matter of fact, simple transfusion had already been tried and had proved unavailing. The immunised blood, which Sir Almroth Wright proposed to employ, was blood taken from a healthy donor and subsequently inoculated in vitro with such a quantum of vaccine as would suffice to render its plasma bactericidal for the microbe with which the patient was infected. As an example of what can be achieved by such a procedure Sir Almroth Wright gave a brief account of a desperate case of wound infection which had been successfully treated on these lines.

During the four years which have elapsed since this lecture was given certain new facts have come to light which serve to reinforce the suggestion that this method of treatment will prove to be of great value. We have learned—by simple experiments which were fully set out in a recent paper by Wright, Colebrook, and Storer [2]—why it is that immunising responses cannot be obtained in the very heavy bacterial infections which Sir Almroth Wright had in mind. The experiments show that the patient's leucocytes are chiefly at fault. Although in respect of numbers, they are not usually deficient, yet in respect of bactericidal functions they are often far below the normal level. They fail to furnish protective substances—i.e., to make an immunising response—when brought in contact with microbes outside the body, and their phagocytic power, and their power of killing microbes extracellularly are also reduced. It is not surprising that patients whose blood shows such defects should, if left to themselves, go from bad to worse. The infecting bacteria multiply and produce toxic substances, while the leucocytes, poisoned by these toxic substances, are unable to destroy the bacteria. Further, in such circumstances, it will be clearly useless to inoculate the patient with vaccine—he is unable to respond to it and will only be harmed. We may, however, sometimes be able to turn the scale in his favour if we can confer upon him a temporary passive immunity, as Sir Almroth Wright proposed, by means of the bactericidal plasma we inject, and if, in addition, we furnish him with a large body of normal leucocytes, capable of making an active immunising response. This is what we seek to do by immuno-transfusion.

Procedure for Carrying Out an Immuno-transfusion.

Our chief aim in this paper is to set out what has been learned from the treatment of a number of patients by this method. The problems of procedure may conveniently be dealt with under the following headings:—

1. Tests which enable us to determine whether an individual patient ought to be treated by the inoculation of vaccine or by immuno-transfusion.
2. Choice of a donor.
3. Immunisation of the donor's blood.
4. Considerations which make us elect to use defibrinated blood rather than unaltered blood or blood in which clotting has been prevented by the addition of decalcifying agents.
5. Procedure for drawing off the blood from the donor and defibrinating it.
6. Study of the question whether, when circumstances require it, the donor's blood may be kept for a few hours before it is injected into the patient.
7. Procedure for injecting the blood into the patient.

Tests to Determine whether a Patient should be Treated by Inoculation of Vaccine or by Immuno-transfusion.

In view of what has already been said it will be clear that what we most want to know about every patient who is suffering from a heavy bacterial infection and is not doing well, is whether his leucocytes are capable of making immunising responses. The direct way to ascertain this is by carrying out a vaccine-response test. For this purpose we take about 1 c.cm. of the patient's blood, defibrinate it, and then, keeping one portion as a control, add to several other portions progressive amounts of any bacterial vaccine which we know to be a satisfactory antigen. After incubation of the bloods for half an hour or so at 37° C., we centrifuge them and test the opsonic powers of the several sera, using for this purpose a staphylococcal or any other suitable bacterial emulsion.

If, on counting the phagocytic intake, we find that the serum derived from one or more of the vaccinated bloods has a notably higher opsonic power than that of the control serum, we conclude that the leucocytes have made an immunising response to the quantum of dead microbes added to those bloods, and we infer from the in vitro experiment that they will also in vivo respond to that quantum of dead microbes (vaccine) when injected directly into the blood-stream. Immuno-transfusion, for the time being, at any rate, is not required for this patient. If, on the other hand, our test shows that vaccination of the blood has not resulted in any increase of opsonic power we infer that the patient's leucocytes are so poisoned as to be incapable of making responses and that immuno-transfusion is indicated.

It will be said, however, and rightly, that the carrying out of a vaccine-response test of this kind takes more time than can usually be devoted to an individual patient. Happily we can substitute for it simpler tests which can be carried out in a few minutes by anyone familiar with "opsonic" technique. Simplest of all will be the evaluation of the phagocytic (not the opsonic) power of the patient's blood. For that purpose all we require to do is to obtain small samples of blood from the patient and a normal individual—two or three drops from the finger will suffice—defibrinate each of them, and then put up phagocytic mixtures consisting of:—

(*a*) 2 vols. of the patient's blood + 1 vol. of a staphylococcal or other suitable bacterial suspension.

(*b*) 2 vols. of the normal blood + 1 vol. of the same suspension.

After incubation of these mixtures for 15 to 20 minutes the phagocytic intake occurring in each is counted in the usual manner. The amount of phagocytosis found in the two specimens will depend, of course, upon the operation of two factors in each sample of blood—viz., the opsonic power of the serum and the activity of the leucocytes. Experience has shown, however, that where a very low phagocytic count is obtained with the patient's blood—say one-third or less of that obtained with the normal blood—this will very seldom be due to a serious deficiency of the opsonic power of the serum: almost always it will be due to a diminished activity of the leucocytes. Further, experience has shown that if the blood of such a patient be submitted to a vaccine-response test we shall obtain only a negative result. We may take it, then, as a rough working rule that where the phagocytic intake obtained with the patient's blood is one third or less of that obtained with the normal blood, the patient's leucocytes will be incapable of

making satisfactory immunising responses to injection of a vaccine, and that immuno-transfusion is indicated.

Where the laboratory worker has rather more time at his command than is required for the very simple test just described he may with advantage evaluate separately the opsonic power of the patient's serum and his leuco-phagocytic efficiency. This constitutes the "chiastic test" (Wright [2]). Small samples of defibrinated blood are obtained as before from the patient and a normal individual (preferably one whose blood is of the same group as that of the patient, in order to avoid agglutination of the red corpuscles in the phagocytic mixtures). The two samples are centrifuged and the serum removed from each; the corpuscles are next washed in two changes of physiological salt solution, and a suitably diluted bacterial suspension prepared. The following phagocytic mixtures are then put up in opsonic pipettes:—

(*a*) 1 vol. of washed corpuscles prepared from the patient's blood + 1 vol. of normal serum + 1 vol. of the bacterial suspension.

(*b*) 1 vol. of washed corpuscles prepared from normal blood + 1 vol. of normal serum + 1 vol. of the bacterial suspension.

(*c*) 1 vol. of washed corpuscles prepared from normal blood + 1 vol. of the patient's serum + 1 vol. of the bacterial suspension.

After incubation of these mixtures at 37° C. for 15 to 20 minutes opsonic films are prepared and the phagocytic intake in each is counted. The ratio of the count obtained in mixture (*a*) to that in the control mixture (*b*) will give us a value for the "leuco-phagocytic efficiency" of the patient's blood. The ratio of the count obtained in (*c*) to that obtained in (*b*) will give us the *opsonic index* of the patient's serum. And, by putting up one more phagocytic mixture, in which both washed corpuscles and serum are derived from the patient's blood we may obtain also—by comparison with the count obtained in mixture (*b*)—a value for the total *phagocytic index* of the patient's blood. Where this "chiastic test" is carried out we apply the same working rule as was suggested above—viz., that if the leucocytic efficiency of the patient's blood is reduced to one-third or less of that of the normal blood, he is incapable of making immunising responses, and stands in need of immuno-transfusion.

In conclusion, we may perhaps recall Sir Almroth Wright's dictum, quoted in the first paragraph of this paper, that immuno-transfusion commends itself especially when all that the surgeon can do has been done. If a large abscess remains undrained, or tissues are retained which are so extensively infected as to flood the blood-stream continuously with overwhelming doses of bacterial toxins, we cannot expect to save the patient by a vaccine or by immuno-transfusion—or, indeed, by any method.

Choice of a Donor.

The requirements of immuno-transfusion do not differ from those of simple blood transfusion in this respect. For both purposes we employ a healthy individual, free from syphilitic, malarial, or tuberculous infection, having first determined that his or her blood is compatible with that of the patient—that is to say, that his or her red corpuscles fail to agglutinate when mixed with the serum of the patient. To test this we have only to obtain a very small drop of blood from the donor's finger, dilute it with three or four times its bulk of salt solution and mix with it a small drop of the patient's serum. If after three or four minutes the mixture still remains a homogeneous emulsion of corpuscles, we judge the donor's blood to be compatible with that of the patient; if, on the other hand, the red corpuscles have run together into clumps easily visible to the naked eye, we reject that donor and test another.

If circumstances prevent our thus matching the donor's blood directly against the patient's serum two courses are open to us. We may either employ any donor whose blood conforms to the characters of group 4 (Moss *)—for the red corpuscles of this type of blood are not agglutinated by any normal serum—or, where it is known that the patient's blood belongs to a particular group, we may seek for a donor whose blood is of the same group. Although in theory there is nothing to choose between these two practices, it has been stated by some who have had considerable experience of transfusions that febrile "reactions" are less commonly seen after the injection of blood from donors of the same group as the patient.

Before leaving this subject it may be well to mention that we have sometimes heard doubt cast upon the necessity for testing the blood of the donor as to its "compatibility" with that of the patient. Medical men naturally hesitate to report unpleasant or disastrous results of treatment, with the result that it may occasionally happen that the dangers attendant upon a certain course of action are not widely realised. Transfusion of blood incompatible with that of the recipient patient is perhaps a case in which dangerous reticence has been practised. We therefore think it well to record the following experience. A patient who had twice been transfused with blood from compatible donors and had borne the transfusions well, required a third transfusion. As soon as the injection began—before even 20 c.cm. of blood had been given—he became very uneasy, complaining of severe burning pain all over. The breathing also became difficult. As these symptoms increased to an alarming extent and were accompanied by some collapse the injection was discontinued. The patient gradually recovered. On inquiry being made as to the cause of this untoward occurrence it transpired that in determining the group of two possible donors, the labels on the two samples of blood had been inadvertently transposed, with the result that a donor whose blood was incompatible with that of the patient was chosen. The conclusion that the symptoms observed were due to this incompatibility of the blood injected was substantiated by the fact that, a week later, after a trial injection of 20 c.cm., the patient was again transfused with blood of a compatible type and showed no symptoms either at the time or subsequently. We have had reported to us also another case where serious symptoms followed the injection of blood taken from a donor of incompatible group. We are not, however, in possession of complete details.

Immunisation of the Donor's Blood.

A word of introduction will perhaps help to explain our procedure. The old idea that a patient suffering from a very severe microbic infection might derive benefit from the transfusion of blood taken from a patient who had recently recovered from a similar infection has been revived during the last few years in a slightly modified form. Instead of taking the blood from the convalescent patient it has been proposed to take it from a healthy donor previously immunised by one or more inoculations of vaccine—either a vaccine prepared from the microbe infecting the patient, or the homologous stock vaccine. The assumption is made, of course, that the blood of the donor, when withdrawn for the transfusion, is richly endowed with "antibodies" having a specific (and destructive) affinity for the microbe infecting the patient. Cases treated in this way have been reported by Hooker,[3] Libman and Ottenberg [4] (1917), Fry,[5] Little [6] (1920). The chief defect of this method is that the donor has been inoculated without any previous test, and apart from such test it is impossible to say that the blood which has been used for the transfusion is in any sense immunised blood. It will be a matter for future investigation whether blood obtained in this way, and verified to contain protective substances, may not find useful application in the treatment of protracted septicæmic infections—e.g., cases of malignant endocarditis.

* The method of ascertaining the blood group of any individual has been described by many authors; the reader may be referred to papers by Lee: Brit. Med. Jour., 1917, ii., 686; or Fleming and Porteous, THE LANCET, 1919, i., 973.

The method of immuno-transfusion suggested by Sir Almroth Wright differs in several respects from that to which we have just referred. It took origin in the observation that the addition of an appropriate quantum of certain vaccines to blood in vitro, or in vivo, resulted in the elaboration of protective substances (as shown by increased bactericidal as well as opsonic power) *within a period of a few minutes to an hour or so.* These protective substances were derived from the leucocytes and were non-specific in character—i.e., they were effective upon all the ordinary pathogenic microbes—and not only upon that one species with which the blood had been vaccinated. It was this non-specific and rapidly evolved immunity which Sir Almroth Wright proposed to exploit for the purpose of immuno-transfusion.

We come now to the practical application of this proposal. Originally, as described by Sir Almroth Wright, we took a preliminary sample of the donor's blood and carried out with it a "vaccine-response test" in order to determine the dose required to evoke an optimum immunising response. Having obtained this information we drew off the half litre or more of blood required for the transfusion, added to it the appropriate quantity of vaccine and, after incubation for an hour, injected it into the patient. Early in 1922, with the gradual development of improved methods of testing the bactericidal power of the whole blood, we learned that immunisation was obtained somewhat more regularly, and in larger measure, if we incorporated the vaccine into the donor's blood in vivo (by intravenous inoculation) and waited one to two hours before drawing off the blood in bulk. More recently still we have ascertained that the subcutaneous inoculation of certain vaccines (staphylococcus, streptococcus, and *B. typhosus*) evokes within four or five hours in normal persons just as striking an immunisation of the blood as is obtained by intravenous inoculation.

The experiments shown in Table I. will serve to illustrate this immunisation. In experiments 1 to 7 a series of normal individuals were inoculated subcutaneously with doses of vaccine as shown in the table. Samples of blood were taken from a vein in each case before the inoculation and at stated intervals after. Each sample was at once defibrinated. In order to compare the bactericidal power of the bloods taken before and after inoculation several 50 c.mm. volumes of each were mixed with 2·5 c.mm. volumes of a graduated series of dilutions of a staphylococcus broth culture, and then transferred to "slide cells," as described by Wright, Colebrook, and Storer.[2] After 24 hours' incubation in these cells at 37° C. the number of colonies which had grown in the blood was counted. They may be taken to represent the number of cocci which survived the bactericidal effect of the blood. Comparison of the number of these survivors with that of the cocci originally implanted, as shown in the table, will indicate the bactericidal effect achieved by each sample of blood.

The experiment given in Table II. is also quoted in order to illustrate a somewhat different procedure for comparing the bactericidal power of the bloods taken before and after inoculation. In this experiment mixtures of each sample of blood with living Staphylococci were prepared, as in experiments 1 to 7, but instead of incubating them for 24 hours in slide cells, each mixture was "explanted," after two hours' incubation, into melted agar at 47° C. and the latter poured into sterile Petri dishes. The advantage of this procedure is that it allows us to test the bactericidal power upon microbes such as *B. typhosus* which do not grow into visible colonies in blood. We are indebted to our colleague, Dr. H. B. Maitland, for the record of this experiment and of experiments 3 and 4 above.

TABLE I.

Experiment No.	Blood of—	Vaccine and dose inoculated.	No. of Staph. implanted in each sample of blood as shown by agar counts.	No. of colonies of Staphylococcus which grew in blood taken— Before inoc.	½ hr. after inoc.	2 hr. after inoc.	6 hr. after inoc.
1	L. C.	Stock staph. 1000 mill.	*(810)	51	66	8	9
			(270)	13	23	5	4
			(90)	3	4	1	1
			30	1	2	1	1
			(10)	0	2	0	0
				Blood taken— Before inoc.	5 hr. after inoc.		
2	K. F.	Stock staph. 1000 mill.	(2187)	137	58		
			(729)	38	16		
			(243)	17	2		
			71	2	2		
			30	2	0		
			15	1	0		
3	A. F. H.	Stock staph. 1000 mill.	556	†61, 52 aver. 56·5	14, 10 aver. 12		
			375	37, 40 aver. 38·5	7, 4 aver. 5·5		
			190	27, 19 aver. 23	6, 6 aver. 6		
			94	17, 19 aver. 18	11, 5 aver. 8		
4	C. B. D.	Stock staph. 1000 mill.	552	‡96, 112, 114 aver. 107	58, 55, 42 aver. 52		
			190	42, 29, 31 aver. 34	16, 19, 25 aver. 20		
			105	29, 22, 24 aver. 25	16, 9, 8 aver. 11		
				Blood taken— Before inoc.	1½ hr. after inoc.	5 hr. after inoc.	
5	L. C.	Stock *B. typh.* 250 mill.	(1270)	6	36	0	
			(423)	2	3	0	
			(141)	0	1	0	
					1 hr. after inoc.		
6	V. D. A.	Stock *B. typh.* 100 mill.	(1270)	60	82	1	
			(423)	10	15	0	
			(141)	2	2	0	
7	A. F. H.	Strept. (Strain "Paxton") 5 mill.	(400)	21	6	13	
			(135)	4	0	3	
			51	0	0	0	
			12	0	0	0	
			4	0	0	0	

Staph. = Staphylococcus. *B. typh.* = *B. typhosus.* Strept. = Streptococcus.

* The figures shown in brackets represent calculated, not actual, counts.
† Tests put up in duplicate. ‡ Tests put up in triplicate.

TABLE II.

Experiment No.	Blood of—	Vaccine and dose.	No. of microbes implanted in each sample of blood as shown by agar counts.	No. of colonies which grew in the agar infected with blood taken— Before inoc. Staph.	Before inoc. *B. typh*	5 hr. after inoc. Staph	5 hr. after inoc. *B. typh.*
8	J. K. C.	Stock *B. typh.* 100 mill.	297	165		91	
			133	51		31	
			724		160		40
			238		73		35

If we total up the figures obtained with Staphylococci and *B. typhosus* respectively in this experiment, and work out the ratio of the number of survivors to the number of microbes implanted in the blood, we get the following result:—

	Staph.	*B. typh.*
With blood taken before the inoculation ..	50 %	24 %
,, ,, ,, 5 hrs. after ,, ..	28 %	8 %

By these and other similar experiments it has been demonstrated that:—

1. Within one to five hours after the subcutaneous inoculation of a normal individual with appropriate

doses of staphylococcus, streptococcus, and *B. typhosus* vaccines, the blood acquires a considerably increased hæmo-bactericidal power.

2. This increased power exerts its effect non-specifically. In experiments 5, 6, and 8 in which *B. typhosus* vaccine was inoculated, and also in experiment 7 in which streptococcus vaccine was employed, the blood shows increased power of killing Staphylococci. (Possibly this general statement will need some qualification. In one experiment—not quoted—after an inoculation of staphylococcus vaccine the blood showed only a very slightly increased power of killing *B. typhosus*.)

3. The development of the increased hæmo-bactericidal power seems to vary with the dose of vaccine. Using 1000 millions of staphylococcus vaccine, satisfactory results were obtained in every instance four or five hours after the inoculation, and in one case (but not in others) so soon as two hours after. (Possibly a somewhat smaller dose of this vaccine would immunise the donor as effectively and more rapidly.) When 250 millions of *B. typhosus* vaccine was inoculated there followed a period of one and a half hours at least in which the hæmo-bactericidal power to staphylococcus was diminished.

4. The increased hæmo-bactericidal power following inoculation has generally disappeared after 48 hours—sometimes after 24 hours. This is not shown in the experimental records quoted, but in one of them (experiment 7) it will be seen that after a very small dose of streptococcus vaccine the increased power was already waning after five hours.

In consideration of these findings we have, for the past few months, adopted the routine procedure of inoculating donors subcutaneously with 1000 millions of our stock staphylococcus vaccine,† and drawing off the blood after a period of four to five hours. Typhoid vaccine (100 millions) is apparently just as effective, but will occasionally induce a slight febrile disturbance in the donor.

Considerations which Favour the Use of Defibrinated Blood Rather than Unaltered Blood or Blood in which Clotting has been Prevented by the Addition of Decalcifying Agents.

In the course of recent work which will shortly be published,[7] the present authors have shown that an addition of sodium citrate, ammonium oxalate, or sodium phosphate to normal blood, in amount sufficient to prevent clotting, considerably reduces its power to kill Staphylococci and Streptococci, this result being brought about by impairment of some of the functions of the leucocytes. The same result is obtained with blood taken from an individual who has made an immunising response to vaccine. In view of this reduction of its bactericidal efficiency we concluded that blood to which decalcifying agents had been added should not be employed for the purpose of immuno-transfusion.

We come, then, to the question which of the two alternatives is best suited to this purpose, unaltered blood or defibrinated blood. Evidently unaltered blood has this in its favour, that it has lost none of its leucocytes; in defibrinated blood, however carefully the fibrin meshwork is collected, we never find more than 70 to 75 per cent. of the number present in the unaltered blood. It would seem, however, that this loss of 25 to 30 per cent. of its leucocytes makes but little difference to the bactericidal power of the blood. In the following table are set out the results of several experiments in which comparison was made between the bactericidal effects obtained with unaltered blood and defibrinated blood respectively.

In these experiments 50 c.mm. volumes of blood were implanted with 2·5 c.mm. volumes of a diluted broth culture of Staphylococci, and incubated for 24 hours in slide cells. The number of cocci which survived and grew out into colonies was as shown in Table III.

† Retailed by Messrs. Parke, Davis and Co.

TABLE III.

Exp.	Blood of—	No. of Staph. implanted in each sample of blood.	No. of colonies which grew in the—	
			Unaltered blood.	Defibrinated blood.
1	A. F.	460	(3 tests) 2, 7, 11 } aver. 6·6	5
2	A. F. H.	318	(2 tests) 3, 1 } aver. 2	3
3	L. C.	130 approx.	0	2

It would appear, then, that from the point of view of providing the patient with efficient leucocytes it matters little or nothing whether we use unaltered blood or defibrinated blood for immuno-transfusion. Nor is there anything to choose between these alternatives in respect of the bactericidal power of their *fluids*. When the blood fluid has the power to kill Staphylococci this is found to be the same for the plasma and the serum.

When, however, we look at the question from the standpoint of ease and convenience in carrying out the transfusion our choice is no longer in doubt—we elect to use defibrinated blood. By doing so—in the manner to be described in the next sections—we avoid all difficulties which arise from the tendency of the unaltered blood to clot (and it follows that we can carry out the injection into the patient as slowly as we wish); we avoid the dissecting out and exposure of the veins of either donor or patient; and, finally, we do not require to have the donor in the immediate vicinity of the patient—indeed, he may be miles away. In a word, all the advantages which have been claimed in the past for the transfusion of citrated blood can now be claimed for the use of defibrinated blood: the one is just as easy as the other.

A theoretical objection to the use of defibrinated blood may occur to the reader. Remembering that for a short time after it is collected defibrinated blood contains active fibrin ferment (as shown by the rapid clotting of fresh blood to which a drop of defibrinated blood has been added) he may fear that the transfusion of blood of this kind might lead to intravascular clotting. This, however, is not the case, for it was established many years ago that fibrin ferment is quite inactive upon blood in vivo. The experiments which proved this were conducted, of course, upon animals, but there is no reason to doubt that they apply equally to man. As a matter of fact, transfusions of defibrinated blood have often been successfully carried out in the past (Bischoff, Halstead, Moss, and others); and during the past 12 months on more than 100 occasions by our colleagues and ourselves without the occurrence in any case of symptoms pointing to intravascular clotting.

References.

1. Wright, Sir A.: THE LANCET, 1919, i., 489.
2. Wright, Sir A., Colebrook, L., and Storer, E. J.: THE LANCET, 1923, i., 365, 417, 473.
3. Hooker, R. S.: Annals of Surgery, 1917, lxvi., 513.
4. Libman, E., and Ottenberg, R.: Trans. Coll. Phys., Philadelphia, 1917, xxxix., 266.
5. Fry, H. J. B.: Brit. Med. Jour., 1920, i., 290.
6. Little, G. F.: Jour. Amer. Med. Assoc., 1920, lxxiv., 734.
7. Colebrook, L., and Storer, E. J.: (Not yet published).

(*To be concluded*)

ROYAL SUSSEX COUNTY HOSPITAL.—On Dec. 13th Lady George Nevill opened the new orthopædic and X ray department at this hospital. The department was presented by the Joint War Committee of the British Red Cross Society and the Order of St. John of Jerusalem, and others, the main equipment having been provided by the transference of the valuable appliances from Lady George Nevill's war hospital at Hove. The announcement was made by Sir William B. Gentle that a sum of money would be devoted to presenting to the hospital a cardiographic department and to endowing the maintenance of the plant for the purpose, to be called the "Lord George Nevill Department."

ON THE USE OF OPIUM IN CARDIAC DYSPNŒA.*

BY CLAUDE WILSON, M.D. EDIN.

IN an extensive, though hardly an exhaustive, search through the literature of the subject, sundry notes have been found recalling the value of opium in various forms of cardiac distress, and a statement by Mackenzie that small doses at bedtime may avert attacks of cardiac asthma, but I have failed to find a record of cases analogous to those which I subjoin, while the fact that Prof. J. C. Meakins does not allude to opium at all in his recent B.M.A. lecture, at Dundee, on the Treatment of Dyspnœa in Cardio-Vascular Disease,[1] would seem to imply that its importance is not generally recognised.

Two Types of Dyspnœa.

Dyspnœa of cardiac origin may be divided clinically into two distinct types: Firstly, the ordinary dyspnœa as an immediate consequence of exertion is present in more or less degree in every case of heart disease. In intensity it may vary from a trifling augmentation of the ordinary breathlessness that any healthy subject may get on undertaking unusual effort, to an extreme condition when slight movements in bed produce breathlessness. Its mechanism is simple and well understood, and its amelioration depends on such general measures as may improve the cardiac condition, with additional relief from oxygen inhalation in extreme cases. Opium is in this condition a somewhat dangerous drug. In the lesser phases it is seldom called for; while in extreme degrees, though it may produce restful sleep, and consequent improvement, its administration may terminate in euthanasia. Still, there are cases where the risk may seem justified.

The second division of cardiac dyspnœa—quite different from the first, though commonly overlapping it—comprises two sub-types, both of them paroxysmal in incidence, seldom initiated, though often revived by immediate effort, and certainly differing in mechanism from the ordinary dyspnœa of exertion. How far the ætiology of these—Cheyne-Stokes breathing and cardiac asthma, so different in clinical picture—may possess a common factor, is for physiologists to determine; but that there is a common factor seems likely from the fact that the therapeutics of each is so similar. Oxygen administered in either case, and in sufficient quantity, will not only very generally give speedy relief, but if continued long enough will often terminate the vicious circle which has somehow been established and the normal respiratory rhythm will reassert itself. But, apart from well-equipped institutions, it is only in exceptional conditions that oxygen is quickly available—at any rate, in sufficient quantity to allow of anything like its adequate exhibition, and the object of this communication is to call attention to the fact, which does not appear to be widely known, that opium is not only in many cases an efficient substitute, but perhaps the treatment of choice. The method of administration has generally been hypodermic, not only to secure a more rapid effect, but because the gastric functions in these cases are usually so much disturbed that absorption by the oral route is uncertain. Morphine and omnopon have proved equally efficacious hypodermically, and occasionally tablets have been supplied to a patient to dissolve under the tongue.

In both of these varieties of paroxysmal cardiac dyspnœa, the cases in which I first used opium were such as presented symptoms so distressing and so alarming that the risk of death while under the influence of the narcotic appeared to be not only justifiable but a necessary one to incur. Since then I have used the drug in many cases of Cheyne-Stokes breathing, and in a still larger number of instances of cardiac asthma, and though the number is not sufficient to generalise upon, I have almost invariably found that a very moderate dose, and often a very small one, not only restored the normal respiratory rhythm—sometimes very quickly—but that orthopnœa was lessened or abolished, that the fluid exuded into the bronchi in the asthma cases was absorbed, and that these improvements endured for periods varying from days to months. Of course, general treatment, including restriction of effort and often digitalis, has been resorted to in each case between the attacks, but details of such measures are omitted from these notes, the object of which is to show the effect of opium on the paroxysms.

Opium in Cheyne-Stokes Respiration.

Cheyne-Stokes respiration varies from a slight undulation of the respiratory rhythm, occurring sometimes only during sleep, and seldom observed unless carefully looked for, to a rare and extreme degree in which the suffering from air-hunger during the height of the active phase becomes almost unbearable. My first was a case of this kind—an old gentleman of 94 years, who had suffered from symptoms of cardiac failure for some years, and had several times had mild bouts of Cheyne-Stokes breathing. On this occasion I called in by chance about noon to find him leaning forwards with staring eyes and open mouth, grasping the arms of his chair and gasping for breath. The gasps reduced in volume and intensity and died away, and there followed a few moments of apnœa when the patient leant back and closed his eyes. Then again began the active phase, and the eyes opened in terror and appeal for relief from the oncoming agony. I had morphine with me and injected a quarter of a grain; then left, paid a neighbouring visit, and came back 20 minutes later with a second dose ready to administer. But I found the sufferer leaning back on his cushions asleep, and breathing quietly and regularly. He slept for four hours, woke up and asked for tea. When I saw him later on he was in bed, feeling quite comfortable, and there was no further attack of Cheyne-Stokes for many weeks. By that time the nurse had both oxygen and morphine available, but the latter was never required, while the first was used but sparingly. He never had another severe attack.

I have seen but two cases of Cheyne-Stokes where the active distress of dyspnœa called for immediate relief, but I have given morphine to several patients for the relief of other symptoms, who, at the time of the injection, showed the respiratory undulations of minor Cheyne-Stokes; and I think in every case, as drowsiness supervened, the abnormal rhythm has been replaced by regular breathing.

In one case of advanced heart failure, both opium and oxygen failed to abolish the periodic rhythm, at any rate, more than temporarily. Oxygen, except for occasional short spells, seemed to worry the patient, but morphine brought sleep, relieved the orthopnœa, and reduced the Cheyne-Stokes rhythm from a major to a minor type. During the sleep induced by opium a mild stream of oxygen was allowed to play below the mouth and nostrils, and the breathing became so nearly regular that the wave character had to be looked for to be recognised, though with slight exertion on waking it became obvious. These conditions continued for two or three weeks. Oxygen was later on given pure or in high concentration from a nitrous-oxide mask, and by catheter in mouth or nostril during sleep for hours at a time. It seldom modified the wave character of the breathing, and never more than temporarily, while an attempt to influence the reflex by rebreathing, thus supplying a mixture of oxygen and CO_2, was resented by the patient, who knocked the mask away with his hand. As general signs of cardiac failure increased, and a fatal issue became obvious, morphine, the only drug which was found to give quiet sleep, was pushed till, near the end, when the Cheyne-Stokes character had assumed a major phase, and became a matter of obvious distress, 1 gr. doses were given every four

* Being one of the opening papers in a discussion on Cardiac Dyspnœa held at the Section of Therapeutics of the Royal Society of Medicine on Dec. 11th, 1923.

[1] Brit. Med. Jour., June 23rd, 1923.

hours. Under these large doses the wave character disappeared, and during the last 12 hours of life the breathing was regular in rhythm. Mucus, which during the Cheyne-Stokes phase had never caused râles, now accumulated in the lungs, and death appeared to be due to a lack of aeration, from semi-drowning.

Opium in Cardiac Asthma.

In cardiac asthma, though attacks vary much in intensity, the urgent call for relief of distress is often much more imperious than is common in cases of Cheyne-Stokes. I cannot doubt that morphine must frequently have been used in these circumstances, and that many practitioners must be aware of its signal value, but apparently very little has been put on record, though its effect in cases of "renal asthma" is, I believe, recognised. In two of the cases subjoined there was obvious Bright's disease, but it will be noted that the attacks of "asthma" did not develop until a definite cardiac element supervened.

My first case was recorded.[2] I append an abstract:—

CASE 1.—A gouty and nephritic retired clergyman of 71 years; breathless on mounting stairs for some years. Heart sounds pure, pulse regular—80–90. B.P. (systolic) 160–180. Sudden angina a month ago, with one or two recurrences. Other usual signs of cardiac failure. Without warning or obvious cause, one night, at 1 A.M., cardiac asthma suddenly developed. Arriving at 1.40 I found the family and two nurses assembled in the room or just outside anticipating death. The patient was raised on a pile of pillows; face and neck congested and cyanosed; hands and forearms cold, pale, and clammy; respirations 48 per minute—gasping: and pulse uncountable and very irregular. Heart in condition of "delirium cordis," no murmurs. Coarse mucous râles all over both lungs. 1.45 A.M.: Morphine gr. 1/3, with strychnine and digitalin, āā gr. 1/60, injected subcutaneously and oxygen administered from cylinder which had been got in for occasional relief of ordinary dyspnœa. 1.55: Aspect easier: respirations 36. 2.10: Comfortable; respirations 28; pulse about 100 and nearly regular. Slept or dozed all night. 8.0: Moving easily in bed without assistance. Pulse 82, regular; respirations 18; no râles anywhere.

Here we have obviously to do with a case of temporary auricular fibrillation, and I have seen other cases since in which the first attack of cardiac asthma apparently coincided with the onset of fibrillation. The therapy in this case was mixed, and the satisfactory result may have been due to more than one element; but subsequent experience makes me feel very sure that the most important factor was the morphine.

CASE 2.—Is of a different character. A spare ascetic man of 64, with a greatly enlarged heart and puffing murmurs accompanying both sounds, but not replacing either, and heard all over the heart. Pulse about 80 and regular. Blood pressure: systolic, 145; diastolic, 70. No albuminuria; attack of cardiac asthma of moderate severity developed suddenly about 2 A.M. When I saw him he was propped on pillows and very restless. Respirations 40; pulse about 100; frequent extra-systoles. Moist râles all over both lungs. Morphine gr. ¼ soon procured easier breathing, which in half an hour came down to 22 per minute, and the râles disappeared. He shortly lay down and went to sleep, and woke up quite comfortable in the morning. Similar attack a week later followed a similar course. It will be noted that no other drug was used, and that the rapid breathing, the orthopnœa, and the râles, along with the great restlessness and appearance of distress, subsided quickly under the influence of a small dose of morphine.

These attacks occurred in November, 1921, but only once since has he had an attack of the asthmatic type, and that a slight one, which again yielded promptly to the same treatment.

CASE 3.—An old lady of 76. Heart disease for years and fibrillating for over a year, but doing well on digitalis. No albuminuria; sudden attack of cardiac asthma about 10 P.M. without obvious cause. Urgent summons by telephone. Found patient propped on pillows, fighting for breath. Respirations 42; pulse about 90 and fairly regular; râles all over both lungs. Morphine gr. 1/6 injected, and in 20 minutes the respirations were down to 30. The discomfort gradually lessened, and in an hour and a half the patient went to sleep and slept well till morning, when she was found lying flat with two pillows. Pulse 74 and apparently regular; respirations 20 and no râles. That was three months ago and there has been no return of dyspnœa.

[2] Brit. Med. Jour., 1913, i., 219.

CASE 4.—A banker, about 54; renal disease of four or five years' duration. Blood pressure: systolic, 240–270; diastolic, 120–160; going about his business and sleeping well. Suddenly, about 5 P.M., developed auricular fibrillation and an attack of cardiac (and ? renal) asthma; orthopnœa; leaning forward in chair gasping. Pulse very rapid and irregular; respirations very rapid, about 45; râles all over both lungs. Morphine gr. 1/3, gradual relief; slept well. In morning was found sleeping with two pillows only. Respiration easy; no râles; pulse got steady and slow under strophanthus. This was four months ago and there has been no further attack of asthma, though ordinary dyspnœa is present on slight exertion, while orthopnœa and insomnia are always present unless controlled by opium. Morphine or omnopon (gr. 1/3) always gives a good night and abolishes the orthopnœa, and this is followed by two or three equally good nights. Then comes the gradual return of insomnia and orthopnœa, till on the sixth and seventh nights he sometimes fails to get any sleep at all, and lies propped up on pillows. Then he has another hypodermic, gets three or four good nights, and the process is repeated.

The above four cases are examples of cardiac asthma in somewhat different types of heart disease, in all of which brief notes were made at the time. They are sufficient to illustrate the effect of opium in these cases; but I have seen several others in which the same marked benefit has followed the same treatment; and such is my confidence in the happy effect, that were I ever to develop such a condition myself I should immediately inject morphine, were I well enough to do so.

Conclusion.

Since I wrote this paper it has been pointed out to me that in all the four cases recorded above mucous râles were noted, and indeed I purposely emphasised this element to show that opium was not, as used to be thought, contra-indicated in such cases. But the suggestion has been made that these cases may be properly described as acute pulmonary œdema, in which morphine seems now to be the accepted treatment. I would, however, submit that my cases are properly described as cardiac asthma. Minor cases occur with few, if any, râles; the cases are obviously of cardiac origin; the paroxysms, which commonly occur at night, are of asthmatic type; there is always orthopnœa; the dyspnœa, I feel pretty sure, precedes the moist râle; and the hyperpnœa is generally far in excess of what the bronchial exudation will account for.

Postscript.

In Sir James Mackenzie's book on "Angina Pectoris," published after this paper was completed, I find the first definite statement that a hypodermic injection of morphine may bring relief in cases of cardiac asthma—"as in the common forms of asthma"—the suggestion being that its action is the same in both cases. Of this I am not very sure. But another statement which appears to me to be of great interest follows (p. 109):—

> Many years ago I had an opportunity of seeing a number of these cases, and observed that before they went to sleep they had a tendency to Cheyne-Stokes breathing, and in one or two instances the attacks of asthma came on at the end of a long period of apnœa. It occurred to me that probably the cardiac asthma was merely an advanced stage of Cheyne-Stokes respiration. A careful study of my cases in subsequent years has convinced me that this is true, although I am not prepared to say that it is true in every case.

Though I have seen both types of dyspnœa in the same patient, I have not personally noticed this close conjunction, but I can well believe it is so; and the suggestion would seem not only to link up the two conditions, and help to explain the success of a common therapy, but also to throw light on the differences in the clinical picture. In Cheyne-Stokes breathing it is, I believe, generally accepted that the phases depend on alternate excess of oxygen and CO_2 in the blood; and, so far as I have noticed, there are few, if any, râles present. With the exudation that occurs in cardiac asthma—if of more than very short duration—there will be a physical impediment to hyperoxygenation, and consequently the hyperpnœic phase will persist, and not become automatically limited.

Clinical and Laboratory Notes.

THE TEMPERATURE OF THE SKIN OVER LIPOMATA.

BY HAROLD BURROWS, C.B.E., F.R.C.S. ENG.

IT is common knowledge that when a fatty tumour is palpated a sensation of fluctuation may be produced which is indistinguishable from that caused by a collection of fluid. A confused or mistaken diagnosis may arise from this cause if on account of its depth or for any other reason the lipoma cannot be readily recognised as such by inspection. For this reason any additional means which will help us to distinguish a fatty tumour from other swellings will be acceptable, and it is on this account that I wish to call attention to the fact that the temperature of the skin over a lipoma is constantly reduced when a comparison is made with due attention to symmetry and conditions of exposure. The relative coolness of the skin overlying a lipoma, as compared with that of a similar area on the opposite side of the body, is so considerable that it can be appreciated readily by palpation with the palm of the hand; and as a diagnostic aid is reliable.

As the test is by contrast only, care, of course, must be taken to make the comparison a proper one both as regards the parts which are compared and the time during which they have been exposed to the air prior to the examination, and it is especially to be remembered that appreciable differences of surface temperature are noticeable in different parts of the same limb. For example, the skin over the patella, in health and in natural conditions, is cooler than that over the quadriceps muscle; while the back of the calf is distinctly warmer to the touch than the skin where the tibia is subcutaneous. The reason for these differences is obvious enough, but they must be borne in mind when inferences are to be drawn from the results of palpation.

I suppose some apology ought to be made for calling attention to such a simple diagnostic aid. Probably generations of surgeons have employed it. Nevertheless I have failed to find any reference to the matter in print, and every help towards a correct recognition of the nature of a tumour may be of value.

Portsmouth.

A CASE OF RUPTURE OF THE HEART.

BY J. KNOX THOMPSON, M.B., B.CH., B.A.O. R.U.I.

A MALE, aged 71, an inmate of Belmont-road Institution, Liverpool, complained on Oct. 12th last of gastric symptoms and debility. I sent him into hospital on that day, and he remained there until the 16th. When he got up on the 17th he asked to be allowed to go back to the house as he was feeling better. About midday he was sitting on a chair in the tailor's shop when he suddenly collapsed and died. At the post-mortem examination on the morning of the 18th I found the pericardial cavity filled with blood-clot, which was adherent to a small linear area on the anterior surface of the left ventricle, and when the clot was removed the breach in the wall of the left ventricle was marked by a few threads of clot adhering to it. The large blood-vessels and the valves were found to be intact, and no aneurysm was present. The heart was about normal in size, but the wall of the left ventricle was perhaps a shade yellower than normal. The rupture was not a straight cut through the wall; the channel was zig-zagged between muscular bundles on its way from the cavity of the ventricle to the surface of the heart, and the aperture was narrower on the inner side than the outer side. The liver was hob-nailed, and there was some sclerosis of the kidneys. The brain was normal.

Liverpool.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SPECIAL DISCUSSION ON CHRONIC ABDOMINAL PAIN IN NERVOUS WOMEN.

A SPECIAL discussion on this subject was held on Dec. 17th, Sir WILLIAM HALE-WHITE presiding.

Introductory Remarks.

DR. R. HUTCHISON said that the cases under discussion did not exemplify any definite disease, but constituted rather what was generally known as a "clinical syndrome." He had described them as those of the chronic abdomen, and Dr. H. Cabot[1] had lately spoken of them as "those painful women." It had been difficult to decide on a title for the discussion: the one eventually chosen implied that the patient was a woman who complained of constantly recurring abdominal aches and pains, often referred to the right iliac fossa. She suffered also from dyspepsia, was profoundly constipated, and often passed mucus in the motions. Her menstrual functions were often deranged. In addition there were remote symptoms of various sorts—headache, "rheumatic" pains, tiredness, nervousness, and insomnia. The mental aspect of the case was often even more pronounced. The patient was depressed, introspective, self-centred, and peevish; was always dwelling upon and magnifying her symptoms, and had an insatiable craving for sympathy. She was a connoisseur in doctors, specialists, and "treatments"; she had often acquired the operation habit, and although any new therapeutic plan usually relieved her for a time the relief was always short-lived. The patient was undernourished, often of a bad colour, and exhibited a greater or less degree of visceroptosis. The stomach was usually atonic, and the gastric secretion rather subacid. There was delay in the passage of the contents through the intestine, especially in the pelvic colon. Displacements of the uterus were common, but the other organs usually presented no signs of disease.

The patient usually belonged to the upper classes; she was rarely met with in hospital practice. She was generally unmarried, or if married, childless, and there was often in her immediate environment some relative who ministered to her constant demand for sympathy. She would have seen many doctors, had probably had several operations, and would have undergone a great many more or less elaborate and expensive treatments without permanent relief to her symptoms.

Dr. Hutchison suggested that the discussion should be restricted to certain definite lines of inquiry, as follows: (1) To what extent were the abdominal pains in these women due to an organic cause, such as dragging upon nerves, kinks, and so forth? The results of surgical treatment should help us here. If the pains could be definitely and *permanently* relieved by operation, it was presumptive evidence that its cause was organic. (2) If not always or not entirely of organic origin, what was the cause of the abdominal sensations? Were they due to a low threshold for pain in these patients so that slight discomforts became magnified in consciousness, and, if so, how was this brought about? Or were they hysterical, a form of "convenient arrangement" as Adler had called it, the result of a subconscious desire for sympathy? The psychologists should be able to throw light on this aspect of the subject. (3) What was the relation of the physical to the mental state in these patients? Was the mental side of the case the result of the physical or was it primary? For example, was it the depressed emotional state in these patients that caused atony of the stomach and intestines, or did visceroptosis and atony lead to emotional depression? If the latter, why did many

[1] Medical Clinics of North America, March, 1923.

women with visceroptosis fail to exhibit any mental symptoms? The part played by the patient's environment in the development of the mental symptoms had also to be considered. Did these symptoms only appear in an atmosphere of idleness and aimlessness, or where there was an excess of sympathy on the part of relatives? It would be profitable to inquire also to what extent, if any, the artificial menopause which many of these patients had suffered was responsible for some of the mental symptoms. Gynæcological experience would be of value on this point. Or had the mental trauma inflicted by repeated abdominal operations anything to do with them? (4) As regards treatment, he thought there would be agreement as to the general medical lines to be pursued, especially as to the importance of recognising these cases in their initial stage, of subjecting them to a suitable fattening cure, with the provision afterwards of an efficient abdominal support, of avoiding drastic aperients, and so on. As regards drug treatment, everyone would admit the utility of the bromides, but he would like to raise the question whether anything could be done for these patients by the use of endocrine preparations. Here he confessed himself highly sceptical. As to surgical treatment, what needed discussion was the degree of *permanent* benefit to be obtained from the fixation of organs, and especially from colopexy. Finally, there was the question of psychotherapy. We wanted to know to what extent psychotherapists found these patients benefited by psychotherapeutic treatment, and what form of it was best suited to their needs.

The Tired Mother.

Dr. J. S. FAIRBAIRN said that his experience of abdominal women did not differ from Dr. Hutchison's, except in a few minor points. Besides spinsters or childless married women, he saw many with small or large families and some who could not be said to be comfortably off, with symptoms like those described. In addition to a general abdominal enteroptosis, there was, in women who had borne children, also some degree of pelvic floor weakness, but with subjective sensations of prolapse out of all proportion to the degree of prolapse actually present. Laxity of the abdominal and pelvic floor muscles though common was not invariably present. Constipation and mucous colitis were also frequent. These patients suffered also from over-doctoring and especially from having had fancy operations and fancy treatment practised on them. It was difficult to form a just perspective of the physical and psychical elements in these cases. They were regarded from almost as many aspects as there were healers of the body. The mechanical school would find an explanation in some usual or unusual position of the uterus or other organ; the chemical school would look for and find an auto-intoxication or some disturbance of metabolism; the Freudian psychologist would discover some repression or conflict. As to the mechanical school, their vision was confined to the anatomical position of organs and was blind to physiology. That school was the curse of gynæcology and was represented by those who did constant fixation operations and hysteropexies; nowadays, however, most gynæcologists admitted the large part played by the mental factor in making women over-sensitive to bodily sensations of a disagreeable kind. Spinsters and childless married women had, owing to our social system, been denied the exercise of the sexual and reproductive function and that in itself must have far-reaching effects, especially if there was no adequate complemental interest to take its place. But there was also another class, the women with children but with little help in caring for them. Long-continued impressions of the same kind without sufficient relief or distraction by other impressions of a totally different type were especially productive of fatigue. For example, the tired mother of four or five young children with little or no help in the house had few holidays, and they were but a change from her own house to rooms at the seaside, where escape from the children was even more difficult than at home. If in addition she had anxiety and sleepless nights nursing sick children or a sick husband, all the factors, mental and physical, were present for the production of chronic fatigue of the higher centres. Another type was that of the woman who after bearing her first child was described by her distracted husband as "never the same woman since her baby was born." She was of the disgruntled order, had abdomino-pelvic pains of varied kinds, and was incapable of exertion and particularly of doing anything she did not want to do, because it always aggravated her troubles. Such patients seemed to divide their anxieties between themselves and their one child, and though Dr. Fairbairn often advised another child, the advice was usually badly received. His experience led him to think that incapacitating abdomino-pelvic sensations of the same type might result in spinsters or childless married women from lack of complemental interests to make up for the absence of sexual and reproductive function, and in married women with children from mental fatigue, and further, that though the incapacity is often determined by muscular weakness it might be present without it. The gynæcologist had no statistical evidence of the proportion of women in whom the uterus lay backward, and hence its ætiological moment could not be estimated accurately. Many women had the uterus lying back with no symptoms, and many women with what was thought by the mechanistic school to be the symptom-complex of that position had the uterus in the normal anteverted position. These women for their restoration to efficiency required reassurance, relief from exacting duties, or fresh interests. The early years of the war with its new impressions temporarily cured many. Operations gave temporary benefit because rest and relief from every-day duties were then secured and an operation had an enormous suggestive effect. Physical exercises and improvement of the physique appeared to Dr. Fairbairn all-important. There was no royal road or dramatic cure, but much might be done by those prepared to give the necessary time and individual attention required.

A Neurological Classification.

Dr. J. COLLIER said that learned neurologists in the past had made an attempt to divide these cases into the following four groups: (1) Those in which the condition is without any other basis than the hysterical state; (2) those in which the condition includes a delusion of the insane type; (3) those in which the natural physical state is one of continual vigilance, apprehension, and fear and attention as regards bodily health; and (4) those in which there is a primary and real bodily cause for the trouble. The three last-named groups might overlap, but the hysterical group was, he submitted, quite distinct from the other groups. In his opinion the majority of the cases fell into the last group, in which a real physical cause existed. The hysterical cases were distinguished by the presence of the definite stigmata of hysteria, and however long lasting they were curable; when successfully cured they did not relapse. Dr. Collier quoted as an example a girl, aged 20, at present under his care, who had suffered over a term of years successively from hysterical hemiplegia, severe abdominal pain, vomiting, hæmatemesis, severe general wasting, and marked acidosis. Operation was contemplated, but Dr. Collier, called in at this stage, ordered instead careful watching night and day. It soon transpired that this patient lived much of her time with two fingers down her throat, with which she scratched her lower pharyngeal veins. The discovery of the fraud and the threat of forcible feeding if vomiting continued produced no resentment, but seemed to relieve the patient's mind, and she made a rapid and complete recovery. The most interesting point about this case was the loss of the deep reflexes from the bodily dyscrasia resulting from starvation. The cases with insane delusions were not very common. The group of cases where habitual self-vigilance and anxiety,

without adequate cause, was the chief condition present were easy to distinguish. Hereditary and familial tendency was often strong, and an easily excitable temperament was always present. The subjects were usually careful livers, even valetudinarians, and might be able and successful workers. Their especial characteristic was the ease with which their symptoms could be temporarily removed by the assurance of any dominant personality for whom they had liking and confidence. The last group, from their symptoms and signs, impelled the conclusion that there was something wrong with the splanchnic region of the anatomy. It was, Dr. Collier submitted, universally accepted that all consciousness of well-being, all feelings of happiness, joy, and elation, of fear, anger, and sorrow, were derived from sensations in the area of the splanchnic viscera, nose, eyes, and possibly meninges; that these sensations were produced by definite bodily reactions, which could in some instances be perceived and registered by electrical methods. If the bodily reaction which depended upon the functional integrity of the organs in which it occurred did not take place, no feeling rose into consciousness, no emotion occurred. The importance of these emotions as the interests and stimuli of our daily lives was incalculable. Their importance in aiding a healthy action of our vegetative organs were doubtless equally important. Dr. Collier suggested that partial failure of the reactions in the splanchnic organs, and especially disorder in the normal production of these reactions, produced the almost ceaseless abdominal unrest and discomfort, the pain, cramps, disordered action, and secondary anatomical changes which were met with in the disease under discussion. The mental effect of these was immensely more important than that of common bodily disorders of sensation in that the former were disorders of the integral mechanism by which well-being, satisfaction, and peace in consciousness were maintained. The cause of such disorder was hypothetical and still to be sought, but Dr. Collier suggested that a metabolic dyscrasia with disorder of activation of the many elements concerned was likely to be responsible rather than any local abdominal condition, intoxication, or derangement of the nervous system.

Maladjustments.

Dr. CRICHTON MILLER said that the phrase "nervous women" was vague in connotation, and unhappily extensive in denotation; it included some of the most exasperating cases we were called upon to treat. He did not propose to consider cases in which an anatomical factor might be ætiological, but before passing to the strictly psychogenic to refer to three groups that for convenience might be classed as functional. These might be referred to as the physically maladjusted. The first of these groups was the amyotonic; such women were apt to suffer from every variety of visceroptosis and therefore from many manifestations of chronic abdominal pain. Therapeutically they react well to rest and massage, but tend to relapse quickly after resuming a normal life and posture. Anchoring operations were only palliative, and in so far as the real ætiology of the condition was concerned had no therapeutic value. It might be that a failure of calcium metabolism was the central pathogenic feature; if this was so, the administration of calcium and parathyroid might be useful. The second group was the vagotonic—those in whom a chronic failure of the adrenal function produced a permanent dominance of the parasympathetic over the sympathetic, resulting in inadequate thyroid activity, loss of tone, low blood pressure, and what might roughly be described as "low vitality." The improvement of an impaired adrenal function appeared to Dr. Miller the primary indication in many nervous women. The third group was the sympathicotonic. In these an increased adrenal activity stimulated the thyroid unduly, all muscular tissue was overactive, and relaxation difficult. The treatment indicated for this group appeared to him pre-eminently psychological. An overactive adrenal function depended on emotional maladjustment, and implied, to his mind, repression with a strong fear affect that was continually stimulating the "fight or flight" mechanism. There remained the cases of psychological maladjustment. The conception of any sort of pain as "all imagination," even if true, was not a particularly helpful one from a therapeutic point of view. If a pain was "all due to the imagination" it was a hallucination, and people who suffered from hallucinations were entitled to treatment as much as those who suffered from a frankly organic condition. A diseased imagination was a morbid entity requiring treatment. There was no problem on which more light had been thrown by recent advances in psychology than on this. It was only by studying the unconscious mechanisms of patients that we could apprehend at all adequately the profound significance of pain as a defence mechanism. An incidental attack of gastritis or dysmenorrhœa might offer a defence of such value to the patient that she perpetuates the pain. To describe this as "all imagination" was grossly misleading, and to infer that by an effort of will the pain could be dispelled was grossly unjust. In certain cases pain served to perpetuate a state of dependence and self-pity as against the state of independence and self-help. Pain might serve as a defence for the married woman against sexual intercourse or parturition. Dr. Miller's experience had shown that at least an appreciable percentage of cases of chronic abdominal pain in nervous women benefited by being treated on analytical lines.

Experience at Duff House.

Dr. E. I. SPRIGGS said that on looking through his cases it appeared that out of 988 women patients admitted at Duff House, Banff, and at Ruthin Castle, in the last ten years, 82 were recorded as having been nervous and having complained of abdominal pain, roughly 8 per cent.; 31 of these had undergone one or more abdominal operations. From the 82 cases he had selected 54 in whom both nervousness and pain were specially prominent, and in whom a cause for the pain was not clinically obvious; and it was upon a review of these 54 cases that he proposed to found his remarks. His conclusion was that, even in very nervous, neurotic, or neurasthenic women, if the complaint of pain was definite, consistent, and persistent, and if, after watching the patient, he believed in the pain, then there was cause for it which sooner or later is found. A diagnosis of neurasthenia as an explanation of pain was generally wrong and always dangerous. Nervousness, of course, might be and often was a result of pain. Another diagnosis, almost as likely to prove wrong, was that of auto-intoxication, since it did not go back far enough. In a large proportion of cases named auto-intoxication, a definite mechanical or inflammatory cause was found. In no less than 32 out of these 54 patients, many of whom had been regarded as neurasthenic for years, some definite condition was found sooner or later to explain the pain. The series did not include patients with visceroptosis and constipation. In six cases adhesions were definitely present in the abdomen. Massage sometimes helped these patients, and also mild aperients with oil enemas. They were difficult to improve by operation. In a number of cases there was general loss of tone, constipation, sometimes with resulting colitis and visceroptosis, of varying degree. Dr. Spriggs did not think that the low position of viscera was the cause of the constipation, &c., but that both were attributable to the poor nervous and muscular tone; we should not, therefore, expect an artificial fixation to cure the condition; and, in his experience, it did not. In the first place these operations were frequently ineffective. That the pain, nervousness, and auto-intoxication were commonly due rather to the lack of function or irregular function of the bowel than to its dropped position was shown in two ways. Firstly, by the result of treatment. It was remarkable how much could be done for these sufferers if time enough was given. The first step in the cure was the elimination, so far

as possible, of the suspicion of more serious causes of pain; this alone gives the patient help and freedom from anxiety. Then came rest, fresh air, an anti-constipation diet, the inculcation of a proper habit, gastric or intestinal lavage, as the case may be, massage, abdominal exercises, sometimes the faradic current, suitable medicine, but not chemical aperients, and in due course increasing outdoor exercise. The first step towards recovery was the relief of constipation without drugs, other than paraffin. The answer to the contention that many people are not able to give the time or bear the expense of investigation or such prolonged treatment was that other and ineffective methods cost in the end more. Patients continually spent more time and money on visits to foreign resorts, voyages, special treatments, and operations of various kinds than it would take for them to be treated by their medical advisers at home or in a hospital continuously, perhaps monotonously, but effectively. In those rare cases of constipation and visceroptosis who did not yield to treatment, the bowel having lost its power of recovery, Dr. Spriggs considered the excision of the inactive part of the large intestine. Of two such patients in this series, one was found to have the muscle of the ascending colon largely replaced by fibrous tissues; she received much benefit from removal of the ascending and most of the transverse colon. The other patient, who was the subject of great visceroptosis and a constipation which proved intractable, unfortunately died from pulmonary embolism after colectomy. Even in the group of cases, of which there were five examples in this series, of women whose nervous and physical state was the direct result of psychical over-strain, it was remarkable how much good could be done by rest and treatment of physical disorders of the abdominal viscera. In conclusion, he suggested that no patient should be branded as primarily psychopathic or mental until physical causes of ill-health had been eliminated. If some definite disease not curable by medical means were found, the surgeon's help should be obtained at once, as a continuance of pain which could not be otherwise relieved added to the neurosis. It was wrong, however, to operate first and investigate after, since ineffective operations made these people worse. He held strongly that operation should not be advised for constipation and visceroptosis, unless the result of adequate and prolonged treatment had shown that the bowel was not capable of passing on its contents in a reasonably normal time.

A Physical Camouflage.

Dr. MILLAIS CULPIN said that from the point of view of the psycho-pathologist there were two dynamic factors in psycho-neurotic symptoms: (1) those arising through bodily changes induced by emotion, and (2) those having an end in view. Dr. Izod Bennett had done experiments in which he had tested the gastric and other secretions after inducing a state of fear under hypnosis, and had shown that the secretions were profoundly altered. It must be remembered that the nervous woman was suffering from a continued unpleasing emotion; we must not overlook the effect of a continued emotional state in producing secretory changes. Motor and secretory disturbances induced by a continued state of anxiety formed one factor in the production of chronic abdominal pain. More important still was the relation of visceroptosis to the anxiety state. Attention had recently been called by Dr. Hector Cameron to the "stance" of certain nervous children—drooping shoulders, sunken chest, lordosis, protuberant abdomen. This stance was familiar also in the nervous adult, and Dr. Culpin suggested that when uncorrected it led to visceroptosis. The second group comprised those patients in whom symptoms had an end in view. A common one was that of obtaining sympathy. Attention was always paid to physical pain by friends, whereas nervous or mental symptoms were not received sympathetically. Since patients with such symptoms had little prospect of help or understanding they were forced to take refuge in the physical symptoms which their own emotions provided. Even if obsessions were not cured the symptoms could with advantage be pushed back to the plane where they belonged, and the patient removed from the category of the chronic abdomen. There was present in most psycho-neurotics a strong tendency to hide their symptoms under a physical camouflage. Anxiety might not be present to the consciousness. Dr. Culpin quoted a patient with mucous colitis, which was emotionally determined by complicated factors. During treatment on analytical lines she said, "I used to think it was a physical disease; looking back I see it was only an excuse." Dr. Culpin pointed out also the importance of the absence of psycho-neurotic symptoms in regard to diagnosis. He had twice recommended exploratory operations in women sent to him for treatment of "neurotic" abdominal pain when he was satisfied of the absence of psycho-neurotic symptoms; in both an organic lesion was found.

He summed up with the following two propositions: (1) A continued emotional state induces physio-pathological changes in the abdominal viscera. These involve secretion, mobility, and position. It is to such changes that the word neurosis may perhaps be properly applied. (2) The symptoms first produced may be used purposefully by the psycho-neurotic patient. The purposes are of infinite variety. The one against which we as clinicians ought to be on guard is the concealment of anxiety or obsessional symptoms which it is our duty to elucidate.

Dr. J. A. HADFIELD said that his experience was limited to hysterical cases—namely, those in whom nothing organic can be found or which are declared to be cured after treatment by physicians and surgeons. Three facts had been generally recognised by medical men in reference to hysterical pains. First, that they had no adequate physical basis. Here a distinction should be made between an organic *origin* and an organic *basis* of hysterical disorders. Most hysterical pain could be traced back to an organic origin, such as inflammatory conditions. But such pains did not necessarily have an organic basis, since the original sensation of pain could, like any sensation, be reproduced as an image. Secondly, the significance of sexual desires had long been recognised in the very name hysteria. Thirdly, long before the Freudian psychology it was recognised that hysteria was frequently the result of the suppression of sex desires. This was expressed in the advice of many physicians to hysterical girls, "All you need is to get married." This was bad advice, for in fact more hysterias were precipitated than cured by marriage. But it nevertheless signified that physicians recognised the significance of sex suppression. What, until the Freudian psychology, we had not realised was that the sex desires which lay behind the hysteria might be quite unrecognised by the patient herself. Behind every hysterical pain there were two factors: First, there was usually an organic origin to the pain; secondly, there was a motive. Illustrations of such motives were a craving for sympathy, jealousy, masochism, and sex traumata. Hysterical pains were of the nature of "gadgets"—i.e., instruments that are employed for a purpose different from that for which they were originally intended. The patient used the hysterical pain for her own ends, whether to obtain attention or sympathy, or to enable her to tyrannise over the household.

SECTION OF ORTHOPÆDICS.

MYOSITIS OSSIFICANS TRAUMATICA.

A MEETING of this section was held on Dec. 4th at 1, Wimpole-street, W., Mr. R. C. ELMSLIE in the chair. Cases and specimens were shown previous to the discussion, which was also illustrated with slides.

Exhibition of Cases.

Mr. A. H. TODD showed radiograms of a patient's right elbow, injured in a laundry hydro-extractor, with resulting dislocation of the ulna, tearing apart of

ulna and radius, and comminuted fracture of the head of the radius. After some weeks' rest in a rectangular splint, massage and movement were applied; pronation and supination were then entirely lost. Plaster fixation was thereupon applied for five months; two months later radio-ulnar arthroplasty was performed and a complete bony bridge was found; the remains of the orbicular ligament had been ossified, and there was a plaque in the anterior part of the capsule of the elbow-joint. The radiograms showed the gradual increase in ossification, followed by its cessation and sharp delimitation.

Mr. W. E. TANNER showed a bony plate removed from a patient who had had a hydatid cyst excised from the under surface of the liver through a right lateral incision. The wound had discharged for three years and then healed. Later the patient began to have pain after meals; a laparotomy above the umbilicus revealed no sign of hydatid disease, but a hard plaque was felt beneath the scar, and the patient was readmitted to hospital with epigastric pain. The epigastric bony scar plate was found lying in the sheath of the rectus and excised. The peritoneum was excised and no adhesions found, but there was a gastric ulcer high up on the lesser curvature of the stomach. Partial gastrectomy was performed and the patient was discharged. The bony plate measured four by one and a half inches; the anterior surface was smooth, but on the posterior surface was a boss of bone to which the rectus was attached.

Mr. K. J. ACTON DAVIS showed a case of bilateral myositis ossificans in an amateur footballer, aged 19, who received a kick on the outer side of the left thigh in the lower third, and was treated with massage until arrival at hospital six weeks after with a bony swelling at the site of the kick. X ray showed myositis ossificans in vastus externus. The patient had rest for some time, and then played football without any disability. A year after the first kick he received another on the right thigh; there was effusion into the joint and a very large hæmatoma on the anterior aspect of the middle of the thigh, with ecchymosis extending along the line of the vessels on the inner side. A small tear was felt in the fibres of the quadriceps in front. The patient now has definite hardening on the outer side of the thigh, which feels bony. Nothing is yet shown by X rays.

Mr. W. B. FOLEY showed a case of myositis associated with new bone formation in a patient who had received a bomb wound in the right upper arm and was operated upon shortly afterwards, a retained piece of metal being removed. There was no history of the use of a tourniquet. Three days later the whole of the arm became acutely painful and swollen. The swelling presented the features of a diffuse acute inflammation of the muscles, but did not proceed to suppuration. Similar attacks occurred many times afterwards. Six months after the wound was received new bone formation was observed in front of the humerus, limiting movements at the elbow-joint. This bone, removed by operation, was stated to have measured 5¾ inches in length. When seen by Mr. Foley ten months after receipt of the wound the patient was admitted to hospital for recurrent inflammatory attacks. Later in the year an X ray showed a recurrence of bone formation in front of the humerus. A Wassermann reaction was strongly positive, and an intensive course of N.A.B. was given. The limitation of movement became prominent again, and in August, two years after removal of the first bony mass, the second mass was removed and found to be definitely submuscular. A specimen of the muscle showed a fibrotic condition, with calcareous deposits. The range of movement was much improved by the second operation.

Introductory Paper.

Sir GEORGE MAKINS said that he would throw no new light on the condition of myositis ossificans traumatica, but would make a few dogmatic statements as to what was included under the title of the subject. The appropriateness of the name was frequently questioned; it was, in fact, an obvious misnomer. The condition was not one of inflammation, being rather an example of the process of repair. Muscle played only a passive part in it. Traumatic osteoma, myosteoma, and other names were used for these tumours, which in no respect resembled osteomata. An osteoma did not become absorbed again; some hard osteomata might eventually slough or necrose, but their spontaneous disappearance was unknown. But these wandering masses of callus within muscle were not comparable to a tumour of bone.

Various Forms of the Condition.—The "occupational" forms of the condition should not be included in the class of tumours following injuries to muscle; they depended on the awakening or renewal of the original process of the formation of bone. These bones, such as rider's bone, were usually found in the origin of a muscle. They might extend widely into the muscle, but as a rule were compact, very loose, and cancellous, generally—and in the brachialis anticus nearly always—in the form of pointed spikes. Thus they were not the same as the masses of bone found, for instance, after injury in front of the thigh. Then there was the metaplastic form, found in tabes, of large masses of bone following trauma. The injection of salvarsan into muscle might produce this form. Again, there was the question of excessive callus production after fractures; persons who showed this exuberant callus formation might have the same idiosyncrasy as those who developed ossification within muscle.

If the term was to remain in use, he suggested that myositis ossificans traumatica be limited to cases in which three essential factors were present—broken periosteum allowing the escape of bone cells, hæmorrhage, and a certain amount of injury to muscle. In the tearing off of periosteum there was hæmorrhage from the canals, which helped the diffusion of bone cells into surrounding tissue; the blood formed a nutrient medium in which bone cells might remain vital and develop, and also determined the future architecture of the tumour. The shape of the latter was determined by the sheath of the muscle. The blood, going into the muscle as a foreign body, excited a reaction, and the muscle offered a highly vascular bed in which a tumour might develop.

Morbid Anatomy and Pathology.—The microscopic interest of the condition lay, he said, in the possibility of metaplastic formation. Was the cancellous bone derived from bone cells set free by trauma, or from cells originally undifferentiated which took on bone form and function? He thought that in the main the cause lay in cells set free from injured bone. Coming to the pathology of the condition, they were entirely ignorant of the reason for its development. In this connexion must be considered the over-production of callus after a fracture; it was said that defective fixation or infection might produce defective callus. Over-production of callus was the rule, but not to a great degree, and in spite of correct treatment myositis ossificans sometimes developed. It was said that patients who developed the condition belonged to a diathesis, but that carried the question little further. It had also been attributed to excessive calcium content in the blood, but that view remained unproved. Cohn, in his observations concerning the deposition of lime salts, held that lime salts were really conveyed by the lymphatic system—that bone supplied these salts to callus, and callus eventually gave them back to bone. In tabes there was also rarefaction of bone; this might have some connexion with myositis ossificans traumatica. The real explanation would probably be reached in the future, when more was learnt of the bodily growth governed by such endocrine glands as the pituitary. The association of two tissues of different kinds might result in the formation of bone. Dr. Drew had shown that kidney cells grown in vitro would develop indefinitely, but that if connective tissue were added the kidney cells would arrange themselves inside this tissue, and a piece of organised kidney would develop.

Diagnosis and Treatment.—Sir George Makins had nothing to say concerning diagnosis. If the condition were limited to cases of ossification within muscle, it was difficult to go wrong if X rays were employed, for these tumours did not resemble any form of sarcoma. As regards treatment, the majority of cases could be treated by rest and by doing nothing to increase the supply of blood to the part. As a rule the tumour would then disappear. Sometimes a scar was left, or operation might be necessary to increase the range of movement. Operation should be deferred for perhaps three months to see if the condition cleared up spontaneously.

Discussion.

Mr. ELMSLIE commented on the large number of situations in which the condition was found. Peri-arteritis ossificans mght occur with or apart from ossification in muscle. Ossification was sometimes brought about by attempting to move a joint too soon. Legal actions were not impossible in this connexion. Remarking on the occurrence of ossification in muscle apart from any known bone injury, he thought these might be due to partial evulsions of muscle. Ossification also sometimes occurred after sepsis, for example, beneath a scar resulting from a puncture made to let out pus from a pyæmic abscess of muscle. In considering the possibility of metaplasia the essential unity of the osteoblast and fibroblast must be remembered. There was some suggestion that bone might be formed direct from fibrous tissue without any escape of bone cells. He thought it very seldom justifiable to operate within the first three months; personally, he watched until the X rays showed no alteration for a month before resorting to operation. He believed it best only to operate for mechanical obstruction.

Mr. W. R. BRISTOW showed slides illustrating ordinary myositis ossificans of the vastus internus, where there was no question of trauma. In one case severe pain occurred and quietened down, only to recur two years later, with extreme wasting of the leg, and a mass of very tender bone. No treatment was of any effect in this case. Another case, exemplifying the length of time the condition might take to clear up, was of a supra-condylar fracture of the elbow in a child; he had kept the elbow at rest for five months, after which the condition had quietened down. He emphasised the importance of teaching concerning this treatment, which was known to members of the section, but very little known outside. He wished to know if anyone could show a case of true myositis ossificans of the brachialis anticus which had been left for some time and then operated upon *with improvement*. He had never found any benefit to the patient to result from operation; the bone merely consolidated down to exactly the same state once more.

Mr. H. A. T. FAIRBANK supported Mr. Bristow's view of the importance of instruction on the subject of treatment. He believed the average general practitioner to be poorly informed in that respect, and instanced a case of forcible bending of an elbow-joint by a practitioner, to whom he had written on the subject, only to receive from him another case which had been treated in the same way. Massage did no harm, but active movements were most useful. Almost always the mass of bone seemed at first to be separate from the main bone, joining it later, and giving the appearance of periosteal thickening. At operation he had found the periosteum complete beneath the bony mass which he had removed.

Mr. ALAN H. TODD described a case of ossification upon the front of the femur, situated apparently in the lowermost part of the origin of the crureus. The patient was a woman of 25, who had an oval loose body lying just beneath the middle of the patella; the knee was opened and the loose body found to be attached by a slender thread, apparently not vascular, to the synovial membrane of the intercondylar space. The loose body was symmetrical and oval, composed of intermingled cartilage and bone; nothing was seen that suggested that it had originated in any injury of articular cartilage or bone. An unusual amount of stiffness of the knee following the operation, it was found that a mass of new bone had formed upon the front of the femur, probably in the origin of the crureus. The limb was completely immobilised, and subsequent X ray examinations revealed the gradual increase in amount, density, and sharpness of delimitation of bone. A year after operation a full range of movement had been restored. Mr. Todd also showed a second series of radiograms, those of a man of 43, injured in the elbow region, without fracture, in a motoring smash. The ossification that had followed mapped out with remarkable accuracy the precise attachments of the anterior and posterior ligaments of the elbow-joint, and the orbicular and other ligaments of the radio-humeral and radio-ulnar joints. Mr. Todd observed that though these ossifications following upon injury had been spoken of as "callus," it appeared to him that this term was used upon totally inadequate grounds. It seemed to him to be preferable to term these formations simply "post-traumatic ossifications." Again, why was there such an extraordinary preponderance of these ossifications in the region of the elbow? Elbow injuries were very common in growing children, but that was not enough to explain the great frequency of post-traumatic ossification in this situation, as compared with all others. It seemed to him that an anatomical peculiarity of the elbow region was probably the true explanation. The islets of cartilage cells, and sometimes of bone cells, found widely distributed through the synovial membrane and even the capsule of the elbow and radio-ulnar joints, were not confined to growing children; they were to be found, also, in adults, just as many other "rests" of embryonic tissue were to be found in persons in whom growth had long ceased. Post-traumatic ossifications, apart from gross bone injury, in adults, were probably examples of activation of rests of chondroblasts or osteoblasts.

Mr. TANNER supported the view that the way to ensure the disappearance of extraneous bone was to rest the part.

Sir GEORGE MAKINS, in a brief reply, characterised as rash his remark about operating after an interval of three months; his own feeling had been to let things alone.

Mr. C. MAX PAGE, Dr. W. T. GORDON PUGH, and Mr. P. MAYNARD HEATH also contributed briefly to the discussion, and Dr. C. LAMBRINUDI read a short communication from Mr. W. H. TRETHOWAN.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASE.

THE WORKING OF VENEREAL CENTRES.

A MEETING of this Society was held at the rooms of the Medical Society of London on Dec. 7th, Dr. F. N. KAY MENZIES being in the chair, when Colonel L. W. HARRISON, the incoming President, delivered his address. He said it was the proud boast of the profession that though its members lived by disease, their ideal was to abolish disease. The principle of prevention of venereal disease by treating the infected underlay the chief recommendations of the Royal Commission on Venereal Disease, and was at the foundation of the Government scheme of free treatment. The scheme had three main sections: (1) Propaganda to induce the infected to apply for treatment and continue with it until non-infected; (2) discovery of infected persons; (3) their treatment until the virus had been rendered inert. Many of those engaged in this work seemed not to have fully realised that the prime motive of their enlistment was the protection of the public health. In the remarks he had to make it was inevitable that there was some criticism of many of the V.D. centres. There was at present a tendency to restrict the outlook to the particular patient, regarding him as a focus of infection needing to be sterilised. It was beneficial periodically to take stock of the situation to see how

the work could be improved and speeded up. To those commissioned to establish a centre he would suggest that the chief aims should be attractiveness of the centre, with efficiency and economy in the working of it. If amenities were very poor, this did not conduce to attendance until discharged, and it would be poor economy if the arrangements resulted in only partial treatment. The average patient with these diseases was ashamed of his condition; hence it should be possible for him to reach the centre without people outside being too much aware of his object. As soon as urgent symptoms disappeared, there were serious competitors for his leisure time outside; hence the times of attendance should not clash with these other amusements; it was not desirable to require attendance on Saturday afternoons, for instance. Larger rooms for the actual work, and smaller waiting-rooms were generally desirable; it was not good that a large number of patients should be kept waiting. Also, every centre should make provision for the intermediate treatment of gonorrhœa. Better and quicker results were obtained in female cases of gonorrhœa when the treatment ordered by the medical officer was carried out by a nurse. And, to be of value, the patient must attend the clinic frequently; hence the importance of arranging times convenient to her. Too often it was assumed that patients would gladly attend at whatever times were set, at whatever inconvenience to themselves. Sometimes it seemed to have been thought too ambitious to embark on new premises, or even to have some rooms set apart entirely for the treatment of venereal diseases. And it should be remembered that gonorrhœa was much more prevalent than syphilis, and the proportion of defaulting sufferers from it was greater. He thought a V.D. centre under the public scheme worked better under one control than when it was distributed over a number of departments; apart from other considerations, it was a more economical plan; the work was better coördinated, and the public health outlook was more likely to be fostered. The number of nurses and male attendants was, in most cases, too small, and duties had to be done by medical people which could safely be left to nurses and male attendants. A trained lady almoner was a most valuable asset in a large treatment centre.

Colonel Harrison remarked that as to the means of following up patients who ceased to attend before they were considered non-infective, it was said that follow-up letters sometimes fell into wrong hands and caused domestic trouble, but a careful consideration of the matter led him to favour the sending of such letters, followed, if no response was received, by another worded more definitely. An important factor in the work was the tracing of contacts; and this could be much aided by tactful questioning of patients as to who infected them. If the medical officer of the treatment centre would place his knowledge at the disposal of the medical officer of health, improvements could be made in propaganda and in methods of advertising. When the private practitioners of the country realised the many ways in which they could help the efforts of the public health service in securing the treatment of the greatest number of infected persons, he, the speaker, thought the necessary effort would be forthcoming, and the practitioner had many opportunities of telling his public how important it was for infected persons to be treated as early as possible and until they were no longer infective. Along this path lay the establishment of a saner attitude on the subject on the part of the general public.

Discussion.

The CHAIRMAN agreed as to the desirability of having an ideal in treatment, especially in regard to treatment of venereal disease. He himself visited 28 such clinics in London, and had often asked himself wherein they failed to attain the ideal, and why. These clinics were often overcrowded; he had seen 100 patients waiting, and this did not help continuous treatment, especially as women patients objected to long contiguity with some others. He advocated the establishment of day clinics; he thought the results would soon justify the step. Colonel Harrison's clinic at St. Thomas's Hospital dealt with 4559 new cases last year, and there were 149,682 attendances, respectively 20 per cent. and 30 per cent. for the whole of London. He thought the V.D. work of a hospital should not be delegated to a junior member; the officer responsible for this department should have a place on the hospital staff.

Dr. LEONARD MYER said the attendance at St. Paul's Hospital clinic was about 20,000; patients could attend on Sunday.

Dr. J. C. BUCKLEY spoke of the difficulty of getting doctors and trained orderlies or nurses for this work in Nottingham. In his clinic the gonorrhœa treatment was kept separate from that of syphilis. A good point about the clinics was that the patients remained under the same doctor. In his establishment there was in operation a thorough system of following up patients who grew lax in their attendance. The irreducible minimum of patients who would not continue attendance was only 12 per cent. It was insisted that attendance must continue until the patient was discharged cured; if he moved to another town, he was given a transfer to the clinic there.

Dr. F. H. LAWSON gave his experiences at the Brighton and Worthing clinics. At the former there were six clinics a week, at the latter two. There was a close and cordial working arrangement with the medical officer of health.

Reply.

Colonel HARRISON, in reply, said that at present there was too much working in watertight compartments. The medical officer of treatment centres could be of real use to the medical officer of health, and vice versa. He believed the St. Thomas's clinic would this year reach a total of 120,000 attendances. The cost per attendance at that centre was 1*s.* 5½*d.* The price of materials for female gonorrhœa subjects was considerable; it was very small for males. With regard to the conference at Copenhagen, it was a great inconvenience that the results of serum tests were reported in different terms. It was most important to have standardisation, especially in the case of merchant seamen and others who travelled over the world. In May, 1921, a resolution was passed at Copenhagen requiring that the blood tests of various countries should be compared with one another; and the first-fruits of that was a London Conference, under the ægis of the League of Nations Health Organisation, at which it was resolved that in a number of European laboratories a comparison should be made of the various methods of testing serum for syphilis. Attention was specially devoted to the sigma test, as standardisation of that would give quite smooth results.

EDINBURGH MEDICO-CHIRURGICAL SOCIETY.

A MEETING of this Society was held on Dec. 5th, Sir DAVID WALLACE, the President, being in the chair.

Exhibition of Clinical Cases.

Dr. MARY H. MACNICOL showed a case of multiple arthritis in an infant following ophthalmia neonatorum. Dr. J. V. PATERSON did not regard the evidence of ophthalmia neonatorum as conclusive.

Mr. DAVID LEES showed four cases of interstitial keratitis treated by intramuscular injections of bismuth. He considered the results to be more satisfactory than those obtained with arsenical salts.

Dr. W. T. RITCHIE showed a case of progressive lipodystrophy in a female, aged 24, single. The disease, which was neither hereditary nor congenital, began at the age of 11 by the face becoming thin. The thinness of the face was progressive for two years, and was subsequently stationary. The face, arms,

and trunk down to the level of the iliac crests were very thin by loss of subcutaneous fat; the gluteal regions, thighs, and legs were plump owing to excess of subcutaneous fat; the muscles were healthy. There was no evidence of disturbance of function of the thyroid, pituitary, pancreas, ovaries, or suprarenals. The case was a typical example of the rare disease, first observed by Osler in 1895, and designated lipodystrophia progressiva by Simons in 1911.

Dr. R. A. FLEMING and Dr. JAMES DAVIDSON communicated (1) a case of acute myeloblastic leukæmia. Clinical notes of the case were given with lantern slides showing mitosis on blood films and the pathological changes in the various organs. (2) A case of aplastic anæmia. Notes were given and lantern slides of the pathological changes were shown. Prof. G. L. GULLAND and Dr. JOHN ORR discussed the diagnosis and treatment of the cases.

Dr. A. NIMMO SMITH and Dr. A. FERGUS HEWAT gave a communication on the

Complement-fixation Test in the Diagnosis of Tuberculosis,

with special reference to pulmonary tuberculosis. The principles on which the test is based were outlined and reference made to the variation in methods of technique. The technique employed in a series of 400 cases was briefly described. The results of the tests were grouped under five heads: (1) Where *B. tuberculosis* was present at the time of the test; (2) cases of clinically active tuberculosis but without bacteriological evidence; (3) cases of clinically inactive tuberculosis; (4) non-tuberculous cases where the Wassermann reaction was positive; (5) patients suffering from diseases other than tuberculosis and where the Wassermann test was negative. In "sputum positive" cases between 80 and 90 per cent. gave a positive reaction to this serological test. In some of the remaining cases the negative result might be explained by low resistance and the absence of formation of antibodies. In a few cases of definite tuberculosis the reaction remained persistently negative. No explanation of this could be offered. The conclusion drawn from the results was that in doubtful cases a positive result was of value, but a negative result could not be regarded as evidence of the absence of tuberculosis.

In opening the subsequent discussion, the PRESIDENT read a letter from Sir Robert Philip, who was unable to be present, in which he confirmed the views expressed. There subsequently spoke Dr. A. RUTHERFORD, Dr. H. RICHARDSON, and Prof. T. J. MACKIE, the latter considering that the test was only of confirmatory value.

BRIGHTON AND SUSSEX MEDICO-CHIRURGICAL SOCIETY.

A MEETING of this Society was held on Dec. 13th, Dr. ELIOT CURWEN, the President, being in the chair.

Exhibition of Cases and Specimens.

Dr. NEVILLE COX showed a case of hereditary deforming chondrodysplasia in a girl aged 13. Deformity and disability in the use of one forearm began about the age of 9, and have been increasing. Recently similar changes in the other forearm had begun to appear. There was difficulty in fully extending the elbow and in supination of the hand. The X ray showed bowing of both bones of the forearm with displacement of the upper end of the radius, and irregular bone formation and bony projections from the lower end of the shafts of both bones adjoining the epiphysis. There were also bony outgrowths on the inner side of the head of each tibia. The child was knock-kneed, and had slight lateral spinal curvature, but otherwise was in good health. None of her three brothers and sisters were affected, but the father had similar bony outgrowths on the tibiæ.

Dr. H. M. GALT showed microscopical slides of a section of normal vagina, normal Fallopian tube, and normal endometrium; two sections of polypus of nose; a section of polypoid growth of nostril; he also demonstrated the latest pattern of Dare's hæmoglobinometer.

Mr. D. A. CROW read a paper on the

Comparative Anatomy of the Nose as a Guide to its Medical and Surgical Treatment.

The development of the olfactory and respiratory portions, he said, was traced throughout the various groups of animals, commencing with fishes, whose nose is exclusively olfactory, reference then being made to the dipnoi, where for the first time the respiratory function is combined with the olfactory. In the reptilian type the two functions are still associated, the olfactory remaining in the upper compartment of the nose, and the respiratory being more definitely associated with the lower. In birds, whose olfactory sense is not unusually highly developed, the same general arrangement persists. Note was then made of the deficient olfactory sense in such species as the duck bill platypus and the cetacea, contrasting this with the very high olfactory development in creatures of nocturnal habit such as echidna, dog, and cat. The organ of Jacobson was demonstrated in the sheep, and the theory of its association with herd sense discussed. The various modifications of the respiratory part of the nose, as distinct from the olfactory, were then illustrated by diagrams of the nose of the kangaroo and walrus. The morphology of the human nose was then dealt with, and attention having been drawn to the very limited area devoted to olfaction the respiratory area was defined, emphasis being laid on the intermediate area, including the accessory sinuses, which is an area of indeterminate function, and like all residual organs, becomes vulnerable to disease, especially when an *acquired* non-functioning due to nasal obstruction is superadded to the non-functioning of congenital origin. The pathology of catarrh was briefly dealt with, and a diagram presented to indicate the sequence of pathological events which resolve themselves not into a vicious circle merely, but into a "vicious figure of 8." Emphasis was laid on the futility of operating on the nose, except as a palliative measure, after destruction of ciliated epithelium, if the expectation is to cure the patient's catarrh; for ciliated epithelium is never regenerated, and on it depends the whole question of sanitation of the nose. But whilst a protest was entered against too frequent and too extensive nasal operations in the later stage, an appeal was made for more readily removing the causes of catarrh during the first half-turn of the vicious "figure of 8," whether the cause were adenoids, septal deflection, constipation, or that main cause of catarrh, a fear of climate.

The paper concluded with reference to reflex nasal effects and a brief note on olfaction; it was discussed and criticised by the PRESIDENT, Mr. A. J. HUTCHISON, Drs. C. H. BRYANT, L. A. PARRY, and DONALD HALL.

Mr. CROW also showed the nose of a sheep dissected. The septum had been half cut away and the remainder reflected, showing the organ of Jacobson partially dissected out. On the lateral wall was seen the large (respiratory) maxillo-turbinal (also shown in cross section) and the numerous (olfactory) ethmo-turbinals, also the naso-turbinal. A small piece of maxillary sinus mucous membrane was exposed.

FOURTH NORTHERN GENERAL HOSPITAL, LINCOLN. The fourth annual dinner of the staff was held at the White Hart Hotel, Lincoln, on Dec. 13th. There were present Lieut.-Colonel Lambert, Majors Tinley, Shipman, Watkins, Rainforth, Lowe, Captains Willoughby Smith, Alcock, Pratt, Barlow, Captain and Quartermaster Dickinson, and the Rev. C. E. Bolam, C.F. A discussion took place on the future organisation of the dinner, and in view of the small attendance this year it was decided to widen the scope of the function and to include as members all medical officers who served in the late war in the Navy, Army, and Air Force who live in Lincoln and the vicinity; together with the quartermasters and chaplains who served at the Fourth Northern General Hospital. It was decided to hold the dinner annually in the spring, and that the next dinner be held in April, 1925, when Colonel A. M. Connell, A.M.S., will preside.

Reviews and Notices of Books.

TREATMENT OF FRACTURES IN GENERAL PRACTICE. By C. MAX PAGE, D.S.O., M.S. Lond., F.R.C.S., Senior Surgeon to Out-patients, St. Thomas's Hospital; and W. ROWLEY BRISTOW, M.B., B.S. Lond., F.R.C.S., Surgeon to the Orthopædic Department, St. Thomas's Hospital. Oxford Medical Publications. London: Henry Frowde and Hodder and Stoughton. 1923. With 142 figures in the text. Pp. xi.+239. 12*s.* 6*d.*

THE treatment of fractures until the late war had fallen into rather a low estate, out of which the brilliant operative treatment of Sir Arbuthnot Lane failed completely to rescue it. For the method of operation and plating was obviously inapplicable to the needs of general industrial practice, seeing that it could only be successful in a well-equipped hospital. Yet as the late Mr. Clinton Dent showed, the amount of temporary or permanent disability after such a comparatively minor injury as a Pott's fracture of the fibula is very great and has a far worse effect on a workman's earnings than many diseases, which are cured by difficult and delicate operations. For these reasons we welcome this book. In it the simplest efficient methods of treating all the fractures that are likely to be met with in general practice are described, not forgetting first-aid devices. The reader is not bewildered by being offered the choice of several methods, but generally he is told what proceeding has given the authors most satisfactory results, and he is shown how to carry it out. The diagrams, X ray pictures, and other illustrations are clear and satisfactorily illustrate the text. A very important question which is too often ignored in larger works on fractures is dealt with in this handbook. That is, how is the Scylla of the danger of permanent stiffness or atrophy from too long fixation of joints and muscles to be avoided, without falling into the fatal Charybdis of recurrent deformity or faulty or deficient union? We think that the advice given on these matters is sound. The difficult region of the elbow-joint receives special attention, and the way to avoid the awful disaster of ischæmic paralysis of the hand is plainly pointed out.

The experience gained by one of these writers in the Balkan war, and by both at the Special Hospital at Shepherd's Bush, has fully qualified them to write with authority on the subject. It is to be hoped that in the future it will occupy a much more important position in the training of students than it has done for some years past in metropolitan schools of medicine. Many a young country practitioner's reputation may be made or marred by his manner of handling a case of fractured femur in a locally important patient. Woe betide him if he does not employ X rays in its diagnosis and treatment! In default of the proper training, or in addition to it, the study of this book will not only prevent his making technical blunders and being cast in damages by a not too intelligent jury, but will ensure that his patients get the treatment best suited to their needs and circumstances.

L'HÉMATOBLASTE, TROISIÈME ELÉMENT DU SANG. Par GEORGES HAYEM, avec avant-propos et annotations par le Dr. L. RIVET, Médecin des Hôpitaux. Paris: Les Presses Universitaires de France. 1923. Pp. 254. Fr.25.

THERE has always been an unfortunate tendency among students of the formed elements of the blood to confer upon them names indicative of their supposed place in the hæmatological genealogical tree before that place had been properly determined. "Hématoblaste" is one of these terms, coined by Prof. Hayem and by him applied to that element of the blood known in this country as the "platelet," with the purpose of indicating the originator's view that these bodies represent incompletely developed red cells. It must always stand to Prof. Hayem's credit that, while physiologists and pathologists in this and other countries were denying their existence, he was actively engaged in the study of the platelets; at the same time it must be admitted that his evidence as to their alleged relationship to the red cells, on the strength of which he has bestowed upon them the Greek polysyllable, is of the scantiest; it mainly depends on the observation, first made by himself, that in states of regeneration after blood loss or destruction the rise of the red-cell count is preceded by an initial increase in the platelets in the circulating blood. Interesting as it is, all that this observation really indicates is a probability that both platelets and red cells derive from a common tissue system. The most interesting portions of the book are devoted to the comparative anatomy of the platelets, a field into which Prof. Hayem was among the first to enter and which is still largely unexplored.

Dr. L. Rivet provides an introduction in which he gives histories of the growth of knowledge on the subject of the platelets, and also of Prof. Hayem, both of considerable interest. He has also edited a series of annotations, constituting Part II. of the book, in which, in the section on the therapeusis of the platelets, he accomplishes a notable feat in describing the procedure of blood transfusion without making any reference to the blood groups. English readers should note that when "anémie pernicieuse" is spoken of that condition of the blood known in this country as "aplastic" anæmia is apparently indicated.

There is still an opening for an up-to-date book on the blood platelets.

THE INFANT AND YOUNG CHILD. By JOHN LOVETT MORSE, A.M., M.D.; EDWIN T. WYMAN, M.D.; and LEWIS WEBB HILL, M.D. London and Philadelphia: W. B. Saunders Company. 1923. Pp. 271. 8*s.* 6*d.*

IN this book, which is addressed to mothers, the writers have set themselves the task of anticipating and answering the questions which mothers are in the habit of asking about the many details of infant care. There are five main sections in the book, dealing respectively with antenatal preparations, feeding, growth and development, care and training, and lastly, diseases, emergencies, and medicines. The final section is designedly short and somewhat sketchy, as it is not intended in any way to take the place of a physician when the child is ill. The range of topics discussed is wide, since the book deals with the treatment of children up to the age of 6 years, but the authors have observed throughout an excellent perspective, stress being laid rather on the principles of treatment than on more or less trivial details. We do not, however, find ourselves altogether in agreement with them with regard to some of their teaching. The list of contra-indications to suckling is over-long, and includes a warning that really delicate and feeble women should not nurse their babies "because, as a rule, the milk is poor, and the strain of nursing is too much for them." It is also considered inadvisable for women who have some chronic disease—other than syphilis—to suckle their babies: while even clinically inactive pulmonary tuberculosis is a contra-indication unless the mother has been cured for a long time and is comparatively well. We fancy that most of the pædiatrists in this country would qualify all these statements. The section on artificial feeding is good, but it is unfortunate that no mention is made of the principle of taking the weight of a baby rather than—or at any rate together with—its age as a guide in regulating the amount of food needed. In the chapter on mixed feeding it is said that where the supply of breast-milk is almost sufficient, the baby may be given the artificial food at one or two feedings in place of the breast—advice which we look upon as entirely wrong in principle. In the main, however, the teaching given is sound and helpful, and the book should be useful to the section of the public to whom it is addressed.

HOW OUR BODIES ARE MADE.

By R. M. WILSON, M.B., Ch.B. London: Henry Frowde and Hodder and Stoughton. 1923. Pp. 246. 5*s*.

CONVERSATIONS on the meaning of symptoms or the reasons for disorders between patients and doctors often end in confusion—each party feeling embarrassed or contemptuous in the attempt to make himself understood in a foreign tongue. This is largely because the doctor thinks in technical terms which are unintelligible even when translated, since the foundations of the lay conception of the structure and functions of the human body have been neither well nor truly laid. There is no common basis on which to build, and those who attempt to find one are apt to be discouraged by the preliminary amount of spade-work required. Often it is not until the clamour of questions arises from a younger generation, questions which can neither be hushed nor answered, that adults become aware how limited is their knowledge of vital processes. If is for these reasons that this little book, which is intended for very young people, will be read greedily and then be studied seriously, not only by children but by parents, to their mutual benefit. Not only has it a wealth of breezy martial imagery which cannot fail to stimulate the desire for more knowledge and for active endeavour towards a sane mind in a fit body, but its valuable negative qualities, absence of patronage and sentimentality, deserve praise. It would be difficult to give an adequate idea of the ingenuity of the analogies suggested and in many cases pictured. The chapter headings are admirably chosen. They include The Hardest Worker in the World, The Soldiers at the Gate, How People are Born, The Red Submarines and the White, When You Cut Your Finger, The Hole in the Wall, Hitting and Hitting Back—to quote only a few. Throughout the book aeroplanes, ships, engines, telephones, and scouts act as prototypes, but never is an analogy strained to explain the facts nor the facts distorted to complete an analogy. The illustrations, with the sole exception of the distorted figure on p. 145, are most suggestive. For example, a diagram of the action of a trap-door makes that of the heart's valves obvious to anyone. The movements of blood corpuscles are much more entrancing when pictured as the activities of red submarines, taking a cargo of fresh air to the lung and removing a cargo of used air, and it becomes of great interest to learn where these submarines are built and where broken up after a short but busy life. It is a happy coincidence that this book should have been published at the same Christmas season as Kipling's appeal to Scouts and Guides: "Be fit—be fit! In mind and body be fit!" Kipling has pointed out the ideal, and Dr. Wilson shows boys and girls and parents how to achieve it.

APPLIED PATHOLOGY IN DISEASES OF THE NOSE, THROAT, AND EAR.

By JOSEPH C. BECK, M.D., F.A.C.S., Chief of Staff, Otolaryngology, North Chicago Hospital. London: Henry Kimpton. 1923. Pp. 280. 37*s*. 6*d*.

Dr. Joseph Beck says, in his preface to this book, that he has long felt the need for a text-book limited to the pathology of nose, throat, and ear diseases; he further states that he has decided to make this work one on applied pathology, and that it was his desire to limit it almost exclusively to his own personal experiences. The effect of the first design is that the clinical aspect of the various affections, and the discussion of their treatment, form by far the larger part of the book, and that the pathology has been relegated to a very secondary place. From the second part of the author's plan it results that the pathological descriptions are extremely incomplete, and that many interesting conditions are completely omitted. Thus, although a place is given to diseases of the œsophagus, the very interesting condition of dilatation without stricture escapes all mention; the pathology, also, of the commoner affections, such as cancer of the larynx, is very inadequately described, and sarcoma of this region is not mentioned at all. Syphilitic labyrinthitis receives a scanty mention from its clinical aspect, but no allusion to its pathology, and even the pathology of nasal polypus is but briefly described. In fact, the book is not a systematic work on pathology, but resolves itself into a sketchy general description of some of the diseases of the nose, throat, and ear. It is very well printed, and some of the illustrations, which are numerous, are excellent.

DIGITALIS THERAPY.

Die Digitalis und ihre therapeutische Anwendung. Authorised German translation (by Prof. Dr. P. NEUKIRCH) of a Monograph written by various Dutch authors. Berlin: Julius Springer. 1923. Pp. 119. $1.35.

THE compliment we pay to this publication is a high one: that we hope it will be translated into English, for it should be read widely. It is a well-balanced critical review of a subject which has become difficult to understand, partly owing to chemical intricacy, partly owing to a plethora of writing, but still more largely by an incoördination of terminology, itself based on international jealousy and business competition. In 1920 the Dutch Government founded an imperial institute for pharmacological and therapeutical research to inquire into suitable drugs and secret remedies. Oil of chenopodium, salvarsan, and quinine and quinidine have been reviewed in the way that digitalis is now treated. William Withering receives full credit for his pioneer work; his writings are quoted at some length, always with approval. The writers consider his remarks so concise and definite that no summary of them is necessary, and compare his monograph with the later writings about digitalis. Modern literature on the subject would fill volumes, but would contain little of practical value that is not laid down in the few pages of Withering's account. After this acknowledgment digitalis is considered from all sides—chemical, pharmaceutical, pharmacological and therapeutical—and strophanthus is included in the review. To trace the history and to assign a worth to the numerous preparations and supposed constituents of a drug like digitalis is a big task, but it is a task here well done; the subject is treated in a manner that is full yet concise, and the text is comprehensive though eminently readable. The publication is a model of what a monograph should be, and is a credit to the Rijks-Instituut.

MEDICAL CLIMATOLOGY OF ENGLAND AND WALES.

By EDGAR HAWKINS, M.A. Oxf., M.D. Edin. London: H. K. Lewis and Co., Ltd. 1923. With 149 Charts (144 in colours). Pp. xiv. + 302. 25*s*.

MEDICAL practitioners will find this creditable and handy volume of much service when dealing with medical climatic problems. The information has been culled from the standard volumes on meteorology and geology, as well as from works on spas, health resorts, pleasure resorts, and travel, and the author has rendered the subject-matter easily serviceable by free use of excellent coloured charts. The various meteorological factors for each district or place are expressed in percentages either above or below the normals for the whole of England and Wales. In this way we may compare for different places the annual mean values of temperature, sunshine, rainfall, daily range of temperature, cloud, relative humidity, relative frequency of the three most prevalent winds, the average number of days of snow, hail, thunderstorm, fog, gale, and rain. Although details of many places are given, cost of printing has been responsible for omissions. While the work fulfils the functions of a general guide, a practitioner should have some personal acquaintance with a place before expecting to obtain any aid from climate. No claim can be made that climate alone will cure disease. Nevertheless, climate may make life much easier and may also act as an efficient assistant to nature and to drugs in very many conditions of ill-health. On the

other hand, an unsuitable place may do much to retard recovery. Attention may well be given to the effects of the place on the patient's mind, and social conditions cannot be left out of consideration.

Climates are divided into two main classes, bracing and sedative; these terms to be construed as relative to the place in which a patient is residing. Brighton may be expected to be sedative to an inhabitant of Margate. Thus a place within a few miles may afford the desired change. The author is to be congratulated on producing a small volume, suitable for ready reference and containing details taken from many well-known fields; nevertheless, many facts in the book will be recognised as old friends. What one misses is the freshness of new facts—that is, some reference to the researches of the past 15 or 20 years in England itself; full attention should have been given at least to the work of Dr. Leonard Hill, F.R.S., on the scientific side, and of Sir Henry Gauvain on the clinical side. If we are to advance, new facts must be emphasised even in our small text-books.

The book is well arranged, and, for the practitioner, is probably the best of its kind now available. One or two maps might with advantage be included in a future edition.

THE OLD DOCTOR.

By FRANK G. LAYTON, M.R.C.S., L.R.C.P. Birmingham: Cornish Brothers, Ltd. 1923. Pp. 170. 4s. 6d.

Dr. Layton has already published a number of plays and books. "The Old Doctor" is a study of medical life in a Midland town before the days of the National Insurance Act. It is written by a man of insight and feeling, keenly alive to the hardships of the general practitioner's life in the back streets of an industrial town, where calls were many but fees often remained unpaid. These were the times of the penny clubs, when the sixpenny doctor—advice and a bottle—flourished; ten years is a long time in the recent history of medicine, and most of the "old doctor's" idealistic schemes have since been realised. The author has a Dickensian touch; his characters are rather types than human beings—the young medical man fresh from the university, the bluff, kind-hearted old practitioner, the unscrupulous cash-down "consultant," the High Church parson, and the Labour leader—and certain inevitably sordid pictures are relieved by the grace of humour.

JOURNALS.

QUARTERLY JOURNAL OF EXPERIMENTAL PHYSIOLOGY. Vol. XIII. Nos. 3 and 4. Pp. 199–404. London: Charles Griffin and Co., Ltd. November, 1923. 20s.—The General Effects of Exposure to Radium on Metabolism and Tumour Growth in the Rat and the Special Effects on Testis and Pituitary, by J. C. Mottram and W. Cramer. This is a contribution to the study of the effects of small doses of radium. When small doses are applied over long periods to young rats these animals put on weight more rapidly than the controls and become very obese. The pituitary body shows changes in all three parts of the gland, and on the testis the primary effect is the atrophy of the seminiferous tubules, the resulting shrinkage of these tubules allowing the interstitial cells to hypertrophy. Comparison with the effects of castration shows that the elimination of the functional activity of the seminal epithelium does not lead to obesity. It only produces certain definite changes in the anterior part of the pituitary body. The obesity is, in this condition, at any rate, the direct or indirect result of the hypertrophy of the interstitial cells, which also produces changes in the intermediate and posterior portions of the pituitary. The observations show that the two component tissues of the testis, the spermatogenic tissue and the interstitial tissue, have two distinct and independent effects on the organism, and of these two effects that of the interstitial cells is the more profound. Even in the absence of the spermatogenic tissue the interstitial cells furnish an internal secretion which produces definite changes in the intermediate and nervous portions of the pituitary, changes which, through the action of this gland and possibly also through the action of some other endocrine organs, affect the metabolism. These effects on endocrine organs and metabolism represent probably the actual basis of the general changes stated by Steinach to occur after implantation of trabecular tissue, and when induced in a senile organism, described vaguely as rejuvenescence. Resection of the vasa deferentia produces no very obvious changes in either testis or pituitary, and does not produce obesity. Rats which have been rendered obese by exposure to radium are more resistant to the growth of transplantable tumours. —Functions of the Pituitary and Thyroid Glands, by Norman M. Dott. This research includes the technique of experimental surgery of these glands and a summary of the author's results. Important both to the experimental physiologist and to the surgeon whose work lies in the domain of cerebral surgery is the very full and copiously illustrated exposition of the technique for experimental operations, more especially on the pituitary gland. The experiments were made on dogs and cats. The experimental pituitary derangements are considered and discussed, and the opinions founded thereon are to be regarded as provisional. The general conclusion arrived at is that the anterior lobe exerts a powerful influence on the cell activities of the body tissues generally and that it exerts a specific and vital influence on tissues of an embryonic type, as represented by the epiphyseal cartilages—X ray photographs are given—and germinal epithelium. The pars nervosa is of less physiological significance, for its complete extirpation causes no physiological disturbance. A lesion of the thyroid, being a simple homogeneous gland, is more easy of interpretation. Total extirpation of the thyroid is compatible with indefinite survival. Complete removal—athyroidism—was followed by subnormal temperature, adiposity, and lethargy—signs which were interpreted as due to depression of the metabolic rate. A single injection of thyroid extract caused a rise of temperature, beginning after 2–8 hours and lasting for 20 hours. Injection of the anterior lobe pituitary extract in the thyroidless animal caused similar results as regards temperature and liveliness. Histological examination showed that there was no degeneration in the epiphyseal cartilages as in pituitary deficiency, the bone and cartilage merely remaining in infantile condition. Thyroid injection restores epiphyseal growth to normal as determined by accurate X ray measurements. In hyperthyroidism the generative organs share the general acceleration of maturation without deviation from the normal beyond their more rapid development. Practically no changes were observed in the other endocrine glands, apart from those in the pituitary body, and, notably, the parathyroids were quite normal after thyroidectomy. Thyroid feeding produced no obvious changes in the thyroid. Athyroidism in young animals was characterised by a state of persistent infantilism. In contrast to the thyroid, which appears to influence the rate of tissue processes only, the pituitary body exerts, in addition, a special influence on the vitality of the embryonic types of tissue.—R. K. S. Lim, Alister R. Matheson, and W. Schlapp contribute papers on "An Improved Method for Investigating the Secretory Function of the Stomach and Duodenum in the Human Subject" and "Observations on the Human Gastro-Duodenal Secretions, with Special Reference to the Action of Histamine." Lim and Schlapp collaborate in a paper "On the Effect of Histamine, Gastrin, and Secretin on the Gastro-duodenal Secretions in Animals." The "improved method" is described and its technique figured and explained; it consists essentially in applying continuous suction to these organs simultaneously by two separate tubes.—The other papers on Syneresis, or Contraction of Blood Clots, by J. W. Pickering and J. A. Hewitt; Effect of Adrenaline on Left Auricular

Pressure, by R. J. S. McDowall; Inhibition of Hæmolysis and Absorption of Adrenaline by Kaolin, by Eric Ponder; Reflex Times in the South African Clawed Frog, by W. A. Jolly; and the Influence of Hypophysectomy on the Rate of Carbon Dioxide Production in Frogs, by Frank R. Winton and Lancelot T. Hogben.

THE INDIAN JOURNAL OF MEDICAL RESEARCH for October contains 33 articles, some of which are of considerable interest. In some instances there are several contributions by the same author, or group of authors.—R. McCarrison has one of his familiar articles on the pathogenesis of deficiency disease.—J. F. Caius and K. S. Mhaskar contribute a series of five articles on the composition of anthelmintics and their relative therapeutic values. These papers throw light on the complex chemical compositions of many drugs which have been tested.—U. N. Brahmachari has a series of three articles on the chemotherapy of antimony compounds in kala-azar, while H. E. Shortt and R. T. Sen contribute a short article on the action of urea stibamine in this disease, a substance which they found more effective than antimony tartrate.—A. C. Vardon has produced desiccated nutrient media for use in small laboratories; W. F. Harvey and K. R. K. Iyengar continue their work on bacterial vaccines. F. W. Cragg has studied the bionomics of the bed bug, and P. J. Barraud contributes two more parts upon the revision of the culicine mosquitoes in India, and describes two new species from Assam.—C. A. Gill has two papers on malaria.—E. Muir has an illuminating article on the treatment of leprosy considered in the light of the nature of its spread throughout the body.—There is another record of the recovery of *Herpetomonas donovani* from the urine in a case of kala-azar, by H. E. Shortt, C. S. Swaminath, and R. T. Sen.

Reports and Analytical Records.

ALUNOZAL.

(DICK, COATES AND CO., 41, GREAT TOWER-STREET, LONDON, E.C. 3.)

IN addition to urazine, a product of the Laboratoire des Produits "Usines du Rhône," to which we called attention in our issue of Nov. 17th, we have received a sample of alunozal, a basic salicylate of aluminium which has been used with some success as an intestinal antiseptic in France, particularly in cases of infantile and tuberculous diarrhœa and in enteritis. The preparation is supplied in compressed tablets and in granular effervescent form containing 25 per cent. of the substance, and it is claimed to be non-irritating. Taken in a little water it is tasteless, and the dose of the granular form is ½ to 1 spoonful for an infant, 1 to 4 spoonfuls for a child of older years, and 3 to 6 spoonfuls for an adult. The preparation should not be taken in connexion with alkaline substances such as bicarbonate of soda, Vichy water, and so forth.

"SOLOID" ALUMINIUM SULPHIDE.

(BURROUGHS, WELLCOME AND CO., SNOW HILL-BUILDINGS, LONDON, E.C. 1.)

The preparation of small quantities of sulphuretted hydrogen for use in water analysis is cumbersome by the ordinary methods. Messrs. Burroughs, Wellcome and Co. have produced a "soloid" aluminium sulphide (0·1 g.) by which an H_2S solution may be quickly prepared by placing in 10 c.cm. of water one "soloid" and allowing it to remain for two or three minutes. By this means the water becomes saturated with H_2S, and a small quantity of sulphuretted solution for water analysis or any other purpose can be conveniently and quickly prepared. "Soloid" aluminium sulphide is sold in packages of 25, each "soloid" containing 0·1 g.

BISMUTHYL, BI-QUINYL, AND INJECTABLE URENILE.

(PRODUITS CHIMIQUES ET PHARMACEUTIQUES "MEURICE," 68, RUE BERKENDAEL, BRUSSELS. LONDON AGENTS: MESSRS. L. H. GORRIS, 49, QUEEN VICTORIA-STREET, LONDON, E.C. 4.)

The use of bismuth compounds for the treatment of syphilis by intramuscular injections has stimulated the Produits Chimiques et Pharmaceutiques, "Meurice" to place upon the market two preparations, bismuthyl, precipitated bismuth (97 per cent. of pure metal), and bi-quinyl, double iodide of quinine and bismuth (5 per cent. of bismuth), for which satisfactory results are claimed by French and Belgian doctors. Both the rapid disappearance of spirochætes as well as complete cicatrisation of any lesions present have followed the use of bismuthyl, the dosage of which is 2 c.cm. aqueous suspension (containing 0·2 of bismuth) for intramuscular injection. This does not give pain and is free from toxic sequels. One dose, which is contained in one ampoule, is administered every five days until 2·5–3 g. of bismuth have been injected—that is to say, 12 to 15 ampoules. The treatment is given three times at monthly intervals, but is stopped after the third treatment if the Bordet-Wassermann reaction remains negative.

Bi-quinyl is a double iodide of quinine and bismuth, the metal being in the relation of 50 per cent. It has been found useful when administered between courses of arsenobenzol, and, like bismuthyl, its administration has been shown to be painless. Patients who are resistant to the action of arsenobenzol have obtained benefit from intramuscular injections. The injection dose for adults is 0·3 g. of the salt, the equivalent of each ampoule, which contains 3 c.cm. of active salt in sterile oil solution. The injection is made every three days until 15 or 20 injections have been given and the course is repeated after a rest of ten days. A smaller dose can be administered to children. Bismuthyl and bi-quinyl are both put up in boxes containing 12 ampoules.

Another preparation of this firm is injectable urenile, introduced in 1921, which is a chemically pure solution of hexamethylene-tetramine. The action depends upon the liberation of formaldehyde by the decomposition of hexamine. In septicæmic infections favourable results have been reported, and even apparently hopeless cases of encephalitis lethargica have responded to its use. In diabetic acidosis an injection of 2, 4, or 6 g. has been found valuable. Administration is by intramuscular injection into the buttock, which with proper technique does not cause pain. Intravenous injections are recommended when four or more grammes of solution are to be injected. The initial dose, as a rule, is 1 g. (0·5 g. for a child) followed by 2 g., 4 g., or more as required. The preparation is packed in boxes of 12 ampoules, each containing either 1 or 2 g.

SALICIN.

(THE ST. AMAND MANUFACTURING CO., LTD., CARNWATH-ROAD, FULHAM, S.W. 6.)

The use in rheumatism of salicin was referred to in the columns of THE LANCET by Dr. T. Maclagan as early as 1876, and since that time it has been increasingly used not only in rheumatism, but in the treatment of certain skin affections and in aborting influenza. Salicin is a glucoside of salicylic alcohol, obtained from the bark of certain species of willow and poplar. It is a British Pharmacopœial preparation, and a little book which is issued by the St. Amand Manufacturing Company to medical men summarises succinctly the stages of its application to various affections, drawing special attention to the use of salicin in influenza. A sample of the drug which we have received is made up in compressed tablets of 5 gr. each, and as they will be sent free to any medical man who applies for them an opportunity is given for testing a drug that has given gratifying results.

THE LANCET.

LONDON: SATURDAY, DECEMBER 22, 1923.

CANCER RESEARCH.

THE scientific reports of the Imperial Cancer Research Fund are issued, not annually, but at irregular intervals, and so, though the Fund has been in existence for 21 years, only seven reports have preceded the one just published. The wisdom of this policy of restraint is apparent to anyone whose acquaintance with medical science is anything but the most superficial. Though the story of cancer research in this country is one of endeavour and achievement, it contains in addition many dark chapters of frustated hopes, and the lot of the workers in this field would be hard indeed were they required to publish according to a time-table. As it is, the custom of the Fund has been to issue from time to time in collected form such papers as appear to be of more than passing interest. These reports represent, as it were, chapters in the history of the Fund; they contain material which is published without haste, and they are recognised by serious students as permanent contributions to our knowledge of the subject. Moreover, while the lay press is only too eager to cater for the appetite of a sensation-loving public, the value to medical science as a whole of an organisation which steadfastly refuses to pretend that the secrets of biology are at the service of the long purse and the strident voice is incalculable.

The present report is made up of ten papers, some of which have already appeared in various journals, while others are now published for the first time. Dr. J. A. MURRAY, the director, divides them into two groups, according to whether they deal with the behaviour and character of the cell already cancerous, or with the changes the cells undergo in becoming cancerous; and we do not suppose that anyone will be found to quarrel with this grouping. But looked at from another point of view, the report is evidence of the extraordinarily wide field embraced by the work of the Fund, for the separate papers might as justly be grouped under the headings, Physiology, Biochemistry, Experimental Biology, Descriptive Pathology, and Experimental Pathology; while the clinical side is represented by the inclusion of Dr. A. SCOTT'S monograph on Paraffin Dermatoses and Cancer in the Operatives of the Scottish Shale Oil Industry, one of the most valuable contributions to the clinical study of malignant disease with which we are acquainted, and now published in full for the first time. A more or less detailed abstract of some of the papers in the report appears in another part of this issue, but certain generalisations which emerge from its study may usefully be considered here. From time to time during the last few years we have suggested that the cancer problem has entered upon a new phase, and the volume under review goes far to bear out our contention. Indeed, to the onlooker the situation is pregnant with possibilities. Intensive study has defined the nature of the malignant cell as it has never been defined before. The various disguises are being stripped from it one by one and its true features are beginning to be revealed. Like most other villains, it is not wholly bad. In many respects, as laborious observations and experiments have shown, it might pass unnoticed in a crowd of normal worthy citizens; yet we know very well that deep down its nature is essentially antisocial. At least one property peculiar to the malignant cell has been demonstrated beyond cavil by the recent work: it is the power to elaborate for itself growth-activating substances which are only produced in normal tissues by cell destruction. It has long been held that the stimulus to growth which causes the proliferation of the healthy cells at the periphery of any lesion, as part of the mechanism of repair, comes from the dead tissues, but the proof that this is really so was very clearly brought out by the method of tissue culture. Whereas embryonic and malignant tissues proliferate immediately if placed in a suitable culture-medium outside the body, adult tissues in similar circumstances exhibit a prolonged latent period of ten days or more before growth begins. This latent period may be abolished by the addition to the culture-medium of a saline extract of normal adult tissue which has been disintegrated and incubated at body temperature. In the destruction of normal tissue, therefore, an activating substance is produced which stimulates the proliferative powers of normal cells. Malignant cells yield a similar activating substance if extracted at 0° C.—that is, without any autolysis at all. This clear difference, then, is established between normal and malignant cells; the malignant cell produces autonomously activating substances which are only formed by the degradation of the protoplasm of the normal cell. The exact chemical nature of the activating substance is as yet unknown, but it seems scarcely likely that it will remain so for long, and with the detection of definite biochemical differences between the innocent and the malignant cell may come the opportunity of the experimental pharmacologist.

In another aspect of the cancer problem, that which deals with the actual production of malignant growths, much progress has also been made. Various forms of chronic irritation have long been associated with tumour formation, both on clinical and experimental grounds, and one of these, the repeated application of tar to the skin, has yielded results of the utmost value. With this method, superficial cancers which lend themselves well to observation can be produced with considerable uniformity in that convenient creature the mouse, as well as in other animals. Several significant observations have emerged from these experiments. In the first place, the time elapsing between the beginning of the tarring and the development of the tumour varies enormously in different animals, three and eighteen months being the minimum and maximum latent periods recorded. Further, cessation of the process of tarring after the applications have been continued for some two or three months does not prevent the malignant change. It would seem that while exposure over a certain period of time to some irritant is necessary to initiate the change, the actual development of malignant characters in a recognisable form is a slow and gradual process. The observations of DEELMAN, quoted in the report, are important as indicating the nature of the malignant change. This author has found that scarification of the skin of the mouse immediately before the tarring is started cuts down the latent period to something like a quarter of the time. In conjunction with the results of tissue culture, this observation strongly suggests that the trauma and the reparative changes following it, put the cells in a susceptible condition, so that they react

more rapidly to the action of the tar. And all these experiments tend to show that the cell in becoming malignant actually acquires new properties; that malignant disease is not due to any inhibition, loss of physiological control, or alteration in tissue tension.

So far the experimental production of cancer has not rendered the situation more hopeful, but rather the reverse, for the assumption is that the cancer of middle life is due to factors potent many years before. But it may yet prove that salvation will be found in this latent period, as it is in hydrophobia, and further investigations suggest possibilities of far-reaching importance. In mice in whom tar cancers have been produced and extirpated by operation, the further application of tar to a different area of the body fails to produce anything more than atrophy of the skin; and similar negative results were obtained in 13 out of 14 animals from which spontaneous mammary carcinomata had been removed by operation. These experiments are admittedly few in number, but they are supported by others planned on slightly different lines, and they fit in with the rarity of double carcinomata in the human subject. While it is obvious that much more work must be undertaken in this direction before it will be possible to speak with certainty, the inference that a profound constitutional change is brought about in the individual by the development and growth of a malignant tumour is very strong, for only thus can this refractory state be explained. Granted the existence of this constitutional change, its recognition and even its control should not be beyond the bounds of possibility. Could it be demonstrated, it might prove of extreme value in diagnosis, while by its artificial production it might even be possible to inhibit the development of tumours.

Even from this brief summary of the report the scope and importance of the work being carried on by the Imperial Cancer Research Fund must be apparent. The close association between the various organisations engaged in cancer research in this country and abroad, combined with the modern facilities for the rapid interchange of experiences and ideas, have focused attention on this subject with an intensity never before approached. Progress since the war has been remarkable, and we are fully justified in hoping for much in the near future. A word of warning, however, is not amiss. We should be rash indeed were we to encourage the public to believe that the cure of cancer will follow immediately upon the attainment of a more complete knowledge of the cause of cancer, for there is no absolute justification for this belief. The tubercle bacillus was discovered some 40 years ago, yet tuberculosis is still rampant. It is one thing to recognise a whirlwind, it is quite another thing to direct a storm; and the medical profession will best retain the confidence of the public by remembering that there is safety in caution.

A GREAT SEER.

DR. FOURNIER D'ALBE is to be congratulated upon having written a very charming as well as interesting biography [1] of one of the foremost scientific men of the day. Sir WILLIAM CROOKES'S personality was a difficult one about which to write, but Dr. D'ALBE has managed to be strictly impartial, thus avoiding the pitfall into which a certain legal luminary on the Bench is said to have fallen, when he concluded his charge to the jury by saying: "Gentlemen, you will give your verdict according to your consciences and the evidence which has been laid before you, avoiding partiality on the one hand and impartiality on the other." To take first the debatable side of CROOKES'S career—namely, his investigations and opinions upon what is called spiritualism—Dr. D'ALBE gives an account of CROOKES'S position from the spiritualist point of view and from the rationalist point of view, and sets out the arguments pro and con with great fairness in Chapter XII. His conclusion is, "spiritualism as a religion may legitimately be studied in a section of anthropology, but spiritualism as a science does not exist."

It is both more pleasant and profitable to follow those portions of CROOKES'S long career which show him as the earnest and capable student of chemistry, as the founder of the *Chemical News*, as the worker in spectroscopy and the discoverer of thallium, as the inventor of the radiometer and the discoverer of cathode rays. One very remarkable feature of CROOKES'S researches was the scientific intuition which came to him from time to time when the balance of his intellect trembled on the verge of a great discovery without, however, quite coming down on the right side. Thus, on p. 26 his biographer quotes an entry from an old note-book under date April, 1854, upon an examination of the spectrum produced by coloured flames which shows that he was within an ace of discovering the law established by Bunsen and Kirchoff in 1859, that when light from a solid or a liquid passes through a gas of lower temperature the gas absorbs those particular rays of light of which its own spectrum consists. At the time of his spectroscopic research CROOKES was in his twenty-second year. It is fair to state that Stokes in 1850 had suggested that the double dark line Frauenhofer D was due to the absorptive action of sodium vapour in the sun's atmosphere. Again, at p. 340, we are given excerpts from an article in the *Fortnightly Review* of February, 1892, based on observation of a few developments of the Hertzian demonstration of electric waves in space, which is a wonderful forecast of wireless telegraphy. Sometimes, however, CROOKES underrated the possibilities of newly born inventions, as, for instance, when in 1878 we find him writing to Prof. (now Sir) William Barrett, "I don't think there is field yet for the telephone to be used commercially. I don't think Bell's company is doing much." His demonstration of electric discharges in high vacua at a meeting of the British Association at Sheffield in 1879 was the first time in which the phrase "cathode rays" was used. A little earlier than this date he had regarded the stream of cathode rays as corpuscular light. Now, however, he called them "matter in a fourth state"—i.e., he claimed, and rightly so as we now know, that he had obtained matter in a state not solid, liquid, nor gaseous, but split up into the apparently ultimate elements which we now call electrons.

CROOKES was a striking example of the British scientific man who rises to great heights by the sheer force of genius, with little or no education in the vulgar sense of the word. He was born in 1832 the son of a tailor in Regent-street. His first school was at Weybridge, where he seems to have been like any other boy, though from his earliest years he was fond of chemistry and was always trying experiments. His early sound training in chemistry he obtained

[1] The Life of Sir William Crookes, O.M., F.R.S. By E. E. Fournier D'Albe, D.Sc., with a foreword by Sir Oliver Lodge. London: T. Fisher Unwin, Ltd. 1923. Pp. 412. 25s.

under that admirable teacher Hoffmann at the Royal College of Chemistry in South Kensington, and within a year of his entry in 1848, his sixteenth year, he obtained the Ashburton scholarship, while at the end of the following year Hoffmann appointed him junior, and in 1851 senior assistant. The story of his struggles and trials, of his never-ceasing work, of his discoveries and successes must be sought for in Dr. D'ALBE'S pages. Besides chemistry he worked in many side lines of scientific matters, such as photography, the separation of gold, explosives, and the cattle plague, for which disease he advocated the use of carbolic acid as a disinfectant and decided (this was in 1866) that the disease must be due to "germinal matter, or living cells, possessing physiological individuality." Perhaps the occasion on which CROOKES came most prominently before the public was in 1898, when as President of the British Association he delivered a remarkable address upon the wheat problem, the value and importance of nitrogen, and the discovery by William Ramsay of new gases. It is worth while quoting his striking peroration:—

"In old Egyptian days a well-known inscription was carved over the portal of the Temple of Isis: 'I am whatever hath been, is, or whoever will be; and my veil no man hath yet lifted.' Not thus do modern seekers after truth confront Nature—the word that stands for the baffling mysteries of the universe. Steadily, unflinchingly, we strive to pierce the inmost heart of Nature, from what she is, to reconstruct what she has been, and to prophesy what she yet shall be. Veil after veil we have lifted, and her face grows more beautiful, august and wonderful, with every barrier that is withdrawn."

Eleven years later—namely, in 1919—CROOKES died in his eighty-seventh year, and with the words quoted above we may leave him, for no words can better express the way of his life.

SPA TREATMENT AND DIURESIS.

THE mere fact that a method of treatment has enjoyed widespread popularity through many centuries is in itself strong evidence in favour of the efficacy of such therapy, nor must we allow the possible absence of any final knowledge of the mechanism of such a method to make us sceptical as to its real value. The pharmacopœia is a catalogue of mysterious agents, and the triumphant elucidation of the action of a sparse handful of them is ample justification for our continued use of the remainder pending the day when their exact properties will be demonstrated. We must adopt the same attitude of expectant faith towards many other medical methods, and such must be our consolation in following the discussion on the diuretic action of spa waters which took place before the Section of Balneology and Climatology of the Royal Society of Medicine and was reported in our columns last week. The continued prosperity of numerous baths and spas which have been celebrated since the Roman epoch is abundant testimony to their powers, and it is impossible to dismiss their good effects as being merely the result of the abstemious régime imposed by the local victuallers.

The discussion itself cannot be said to have thrown any clear light on the action of these waters. Dr. C. W. BUCKLEY, in his opening address, was at pains to admit this. He drew attention to the fact that the concentration of salts present in such waters is often much lower than that required to provoke diuresis when administered in artificial solution. There is not even any clear consensus of opinion as to which elements have or have not a definitely diuretic effect, Keller and Violle holding that NaCl is definitely antidiuretic whilst a host of pharmacologists maintain the contrary opinion. Effects of the waters of various springs upon nitrogen excretion are equally obscure. Extravagant claims, such as that the total daily excretion of nitrogen is increased to a notable degree, may be dismissed at once, but that some alteration in the proportion of the various nitrogenous constituents of the urine may be produced is strongly suggested by several recent researches, though in this respect the comment of Dr. W. Langdon Brown, who pointed out the wide normal variation in these constituents due to diet, must be borne in mind. In face of these difficult problems there is a tendency to seek explanations in the most recent and possibly most nebulous realms of biochemistry. Thus it was suggested by one speaker that some spa waters reduce the hydrogen-ion concentration of the blood, an effect which would, in the view of eminent physiologists, be rapidly fatal if it were possible of achievement. Others seek enlightenment by studying the radioactive properties of various springs; that such waters are sometimes radioactive is certain, but, as Dr. BUCKLEY pointed out, there is as yet no evidence that their diuretic properties are due to such agencies.

Recent work [1] has shown that the ingestion of water alone, without a corresponding excretion, may produce symptoms resembling uræmic convulsions, and even a fatal effect when the intake is prolonged for any length of time. These observations were made on large series of animals under careful laboratory control, and it seems probable that it is only when spa waters are similarly studied with the aid of carefully controlled experiments that we shall secure any true insight into their properties and effects.

MEDICINE IN HOLLAND.

EDUCATION stands high in Holland. We in this country can hardly challenge comparison with a State of 7,000,000 inhabitants which has no less than three State universities—Leiden, Utrecht, Groningen; a municipal university—Amsterdam; a technical university—Delft; a veterinary university—Utrecht; and an agricultural university—Wageningen: leaving out of account altogether military, trade, and art academies and private religious institutions. Four of these universities have a complete medical faculty, and together they find occupation for nearly 75 professors teaching purely medical subjects, not including the ancillary sciences. The compulsory term of study for the State medical diploma is seven years, five of which must be devoted to clinical work, and in spite of this very high standard, on an average about 100 medical students qualify each year. In the near past, students from the Netherlands, although polyglot, have, as a rule, been able to follow the German language more easily than English or French, and were to be seen attending clinical courses in all the German-speaking medical schools of Europe, for it is the continental fashion to spend at least a summer semester away from the home school. We are glad to give in another column some information from a Batavian correspondent on current medical affairs, for we regard the time as ripe for a closer understanding between medicine and its disciples in the two countries. Prof. E. H. Starling pointed out not long ago that the unique geographical position of Holland designed it to bring this country into touch with modern European thought. Through the efforts of the Anglo-Batavian Society we have already learned at first hand of the work of Prof. Hijmans van den Bergh and of Prof. C. Winkler, both of Utrecht. There seems to be an increasing interest amongst medical students in Holland for English and American periodicals and manuals, and the pre-war statement is no longer true that 80 per cent. of students use nothing but German text-books. The medical world in Holland, as here, bears the stamp of its national peculiarities, and medical entente can only be served by mutual understanding of the scientific, practical, and social points of view of the two nations.

[1] THE LANCET, 1923, ii., 838.

Annotations.

"Ne quid nimis."

THE PREVALENCE OF INFLUENZA.

THERE has been the usual sharp seasonal rise in the deaths from influenza and respiratory disease, attended with the usual questioning as to the prospect of a serious epidemic of influenza. There is no simple arithmetical rule for prophets, and the only indications at our disposal of an approaching epidemic of respiratory diseases are (1) deaths ascribed to influenza, and (2) notifications of pneumonia. With regard to (1), there is a relatively heavy increase in the numbers of deaths both in London and the 105 great towns—the number was 103 in the week ended Dec. 8th, as against 68 in the previous week. There are also small but definite increases particularly in the great towns of Lancashire (included, of course, in the total 105 great towns). The age-distribution of these deaths is similar to that observed in the influenzas prior to 1918–19; in other words, there is no sign of the sharp change of type which was the most disquieting feature of the great pandemic. With regard to notified pneumonia, there has been a tendency to rise for some weeks, and last week there was a large increase in the North-Western area, while Yorkshire, which is usually affected early by respiratory epidemics, is now reporting many cases. The difference, however, between the notification rate this year and that of 1922 is not very great. So far as this evidence goes, the present may be regarded as a minor recrudescence, probably favoured by the fogs of last month, and perhaps by the crowds associated with the General Election.

ÆTIOLOGY OF BLACKWATER FEVER.

ALTHOUGH evidence has been accumulated all over the world that the constant factor associated with hæmoglobinuric fever is malaria, and, further, that it is the malignant tertian parasite (*Plasmodium falciparum*) which alone is concerned with the production of this disease, many observers have attempted to find another causal organism. Various organisms have been described other than malaria as the probable cause of blackwater fever, but these have all been discarded. More recently spirochætes or a special species of this group have been suspected, and in 1912 Napier favoured the view that syphilis predisposed to this condition, but Barratt and Yorke (1909), Arkwright and Lepper (1918), and Dudgeon (1921) showed there was no connexion between the two diseases. On the other hand, there is strong evidence that syphilis is the predisposing cause of paroxysmal hæmoglobinuria. True spirochætes have been found associated with hæmoglobinuric fever. Ashburn, Vedder, and Gentry, in 1912, and Cook, in 1913, described this disease associated with relapsing fever, and Schüffner (1920) described a case complicated with an attack of acute infective jaundice. Noc and Esquier (1920) found numerous spirochætes in the liver of a fatal case. These findings, however, can only be regarded as the accidental accompaniment of one disease with another. More recently Blanchard and Lefrou in 1922, using a special technique by which the citrated plasma of 10 c.cm. of blackwater fever blood was subjected to triple centrifuging, described leptospira in the deposit from three cases. The deposit from one of these cases inoculated subcutaneously into guinea-pigs produced a fatal disease, and in one of the subinoculated animals hæmorrhages were found in the peritoneal cavity and in the bladder.

Dr. J. G. Thomson, director of protozoology, London School of Tropical Medicine, who has made two expeditions to Rhodesia in 1922 and 1923 to study hæmoglobinuric fever in that area, used Blanchard and Lefrou's technique in order to confirm the work of these observers. The result of the investigation of the first six cases proved negative.[1] Low and Duncan confirmed this work shortly afterwards in one case, and more recently Thomson has brought forward conclusive evidence [2] that blackwater fever develops as the result of repeated attacks of malignant tertian malaria. The blood of 15 cases of blackwater fever was examined at different stages of the disease from the first day until recovery by Blanchard and Lefrou's method with universally negative results. The conclusion arrived at is that the numerous motile filaments seen under the dark ground illumination in all these cases and in normal cases are the well-known artefacts which have so often been mistaken by other observers in the blood of various diseases for the causal organism of such diseases. Subinoculations in guinea-pigs failed to produce any symptoms or pathological changes. From this it is concluded that there is at present no evidence that spirochætes or a special species of spirochæte are responsible for blackwater fever, and the relationship of malaria to this condition is regarded as undoubted.

A PIONEER OF PUBLIC HEALTH.

Two years ago the University of Manchester lost a valued fighter in the field of public health through the death of Prof. Delépine, and on Dec. 12th last there was unveiled to his memory a portrait bust, erected in the Public Health Laboratory of the University by former colleagues and students. The bust bore the following inscription: "Auguste Sheridan Delépine. Born January 1, 1855. Died November 13, 1921. Founder and first director of the Public Health Laboratory. Professor of Pathology 1891–1904. Professor of Public Health and Bacteriology 1904–21." The unveiling ceremony was performed by Sir George Newman, who spoke in feeling terms of the work Prof. Delépine had accomplished, for the University, for the city of Manchester, and for the public health of the nation. An outline of that work was given in THE LANCET (1921, ii., 1080), and we would here record the personal tribute paid to the worker by the Chief Medical Officer of the Ministry of Health. Prof. Delépine, said Sir George Newman, was a pioneer in associating a university with the training and work of the medical officer of health. He held strong and liberal views, springing from deep and sincere convictions, as to the value to the community and to the nation of the public health service, inculcating high ideals for public medical officers, and extending in various directions the ever-widening sphere of their work. He gathered round him a remarkable group of earnest students who gladly learned at his feet and in after years preached his gospel in various parts of the land. For he was an inspiring teacher, especially to the few, and he won the admiration and affection of his pupils. In the study of disease Delépine was chary of anything which tended to lessen the responsibility of the seeker. In his last published paper he wrote regarding the cause of disease: "I think it is better to attach too little than too much importance to personal predisposition, for the doctrine of predisposition has the same influence in medicine as that of predestination in religion; both tend to make us overlook our responsibilities."

Prof. Delépine, of French descent though a naturalised Englishman, was a man of very original mind, fertile in idea, acute in perception, resourceful in the invention of the ways and means of research, precise in its exercise, and meticulous in its findings. He was widely read in the literature of medicine and its allied sciences, with a retentive memory and a broad outlook, and able to utilise and apply the knowledge which he acquired. While possessing these exceptional gifts, Delépine was an indefatigable workman and was laboriously conscientious, reluctant to publish his results until he was satisfied that his conclusions were valid and invulnerable. An enthusiastic believer in preventive medicine and its potential

[1] Brit. Med. Jour., 1923, i., 986.
[2] Legislative Council of Southern Rhodesia, White Paper, 1923.

influence in the life of human society, he became an inspirer and encourager of others. Though he failed to win some of the world's glittering prizes, he became something of a national leader in his subject, devoting his life and sacrificing much in order to establish a great school of public health at Manchester University. The master-word was work, and the purpose was production and service; in fact, Delépine seems to have compounded in himself some of the fundamental requirements of the new model of public health officer. He had in no small degree two of Pasteur's chief characteristics—love of truth and love of humanity. He sought truth and pursued it, and he was prepared to follow truth wherever it led. And more than that, he bent himself, through 30 years, to the task of applying knowledge to the improvement of man's estate and of directing truth to the growth and emancipation of man's mind. It is a great and splendid thing, Sir George Newman concluded, for a university and city to have such a man as Delépine. To him was given the reward foretold by Thucydides—namely, the grandest of all sepulchres, not only that in which his mortal dust is laid, but a home in the minds of men where his glory remains, carved not in stone but woven into the stuff of other men's lives.

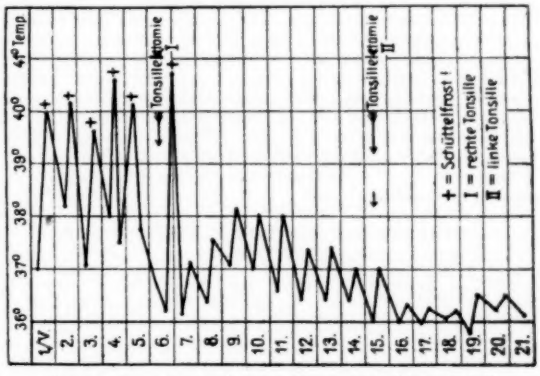
SICKLE-CELL ANÆMIA.

Dr. John G. Huck,[1] of the Biological Division of the Medical Clinic of Johns Hopkins University and Hospital, who reports 14 illustrative cases, defines sickle-cell anæmia, which was first described by Herrick in 1910, as a hereditary disease transmitted by and occurring in both males and females with equal frequency, in which the red corpuscles acquire a characteristic sickle or crescent shape. There are certain characteristic clinical symptoms, especially anæmia and leg ulcer. All the cases hitherto reported have occurred in negroes or mulattoes. No post-mortem findings have been recorded. The leg ulcers have the round, punched-out, and indurated appearance of syphilitic ulcers, for which they are often mistaken. The base of the ulcer is composed of granulation tissue possessing no characteristics suggestive of a specific ætiology. The surface is clean and there is a total absence of any necrotic membrane overlying it. The blood flows and coagulates normally in all forms of the disease. The number of red cells ranges from 1,500,000 to 4,000,000, and the hæmoglobin from 30 to 40 per cent. The colour-index is usually normal or high. The leucocytes are slightly increased in number, ranging from 10,000 to 20,000. Films show a moderate anisocytosis and poikilocytosis, which occurs most frequently during relapses. The poikilocytosis consists of crescentic or sickle-shaped cells with an occasional oat-shaped cell. There is a moderate degree of polychromatophilia. Nucleated red corpuscles of all varieties are present, but normoblasts are especially common. The differential formula of the leucocytes is not characteristic. The polymorphonuclear neutrophile cells are usually increased in number, and there is sometimes an increase of the polymorphonuclear eosinophiles or small lymphocytes. Large mononuclears, which may be seen engulfing red corpuscles, are sometimes present in large numbers and may be responsible for the anæmia. The number of blood-platelets is increased, ranging from 300,000 to 500,000. On examination of fresh preparations of the blood only a few red corpuscles with a crescent or sickle shape are seen at first, but after 6 to 24 hours from 25 to 100 per cent. of the cells, according to the severity of the disease, assume this form. Clinically, cases may be classified into symptomless, mild, and severe. Those who have no symptoms go through life like normal individuals, and it is only by the chance examination of incubated samples of fresh blood that the diagnosis is made. In mild cases the chief symptoms are weakness and fatigue, and occasionally muscular and joint pains, which disappear after rest in bed. In severe cases the chief symptoms are inability to work due to weakness, leg ulcers, muscular pain and stiffness, and often sharp pain in the epigastrium, especially after food. Fever is usually present, but the temperature is rarely higher than 101° F., unless there is a superadded infection such as tonsillitis, to which the patients are usually susceptible. Remissions and relapses lasting three to six weeks are frequent. In the symptomless and mild forms the prognosis is excellent, but in the severe forms it is unfavourable owing to suceptibility to intercurrent affections, especially pneumonia and tonsillitis. The condition has never been cured, but under treatment by simple hygienic measures, rest in bed, and administration of iron and arsenic, the relapses are shortened and the remissions made longer.

[1] Johns Hopkins Hospital Bulletin, October, 1923.

CHRONIC TONSILLITIS AND PUERPERAL SEPSIS.

A REMARKABLE instance of the result of a chronic tonsillar infection on puerperal infection is reported by Dr. Otto Blass,[1] of Bielefeld. The patient, aged 27, developed a high temperature with rigors three days after being delivered of a premature infant. A few days later a painful swelling of the right thigh appeared, and for the next seven weeks the pyrexia curve remained septic in character, with a daily rigor. During this time she had an acute attack of tonsillitis. (She had previously suffered with repeated infections of the pharynx.) At this stage she was admitted into the hospital in a deplorable condition of emaciation. There was marked trismus, the tongue was dry and cracked, temperature 39·2° C., pulse 130, and commencing decubitus was present. The abdominal wall was rigid, infiltration of the right parametrium could be felt, and there was a tender swelling in the right groin. Staphylococci were grown from the blood, the leucocytes numbered 23,800 per c.mm., and the urine contained hyaline and granular casts. For the next few days the temperature



Temperature chart, showing times of right and left tonsillectomy and rigors. (†)

swung up daily to 41° C., in spite of intravenous injections of silver preparations, rivanol and chinin, the general condition becoming worse and the trismus increasing. This condition, together with the onset of aural pain, led to the diagnosis of a tonsillar infection, and tonsillectomy was performed first on the right side and later on the left. The right tonsil was found to have a small peritonsillar abscess, but the left only showed slight changes. The result of this procedure is best demonstrated by the temperature chart. With the fall of the temperature the general condition improved rapidly, the œdema of the leg and the swelling in the groin disappeared, the blood became sterile, and the urine showed no pathological changes. When the patient was discharged, apart from slight adhesions drawing the uterus over to the right, the pelvic examination revealed nothing abnormal. It is

[1] Deutsche med. Wochenschrift, Nov. 16th, 1923.

possible that puerperal infection is more often than we think the result of a hæmatogenous metastasis rather than an external infection, and a more exact investigation for a possible focus might well be made in many cases. Dr. Blass mentions a second case in which tonsillectomy brought about marked improvement and caused the blood to become sterile, although unfortunately the patient died of broncho-pneumonia.

X RAY EFFECTS ON TISSUE CULTURES.

AN important contribution to the study of the changes observed in tissue cells after exposure to soft X rays was recently made by Dr. T. P. Strangeways and Dr. H. E. H. Oakley to the Royal Society.[1] The tissue cells were those from the choroid of chick embryos of six to seven days' incubation and they were cultivated in vitro. The cultures were exposed to X rays for various lengths of time while at incubation temperature. In each experiment four cultures were exposed to the X rays, two were stained immediately, and two were returned to the incubator for 80 minutes before staining. The authors describe in detail with the aid of some beautiful drawings the changes noticed in the cells under these various conditions. In common with several previous investigators the authors find that the cells in active mitosis are more vulnerable to the rays than the cells in the growing stage. The alteration in mitosis may be of quite a temporary nature, for the authors find that if cultures in which mitosis has ceased owing to irradiation are returned to the incubator for some hours, cells in mitosis are again found. Certain granular changes and fragmentation of the chromosomes at metaphase and anaphase may occur without an actual cessation of mitosis; if the radiation is prolonged the daughter cells show abnormalities and may contain two or three nuclei. The authors often refer to "breaking-down cells." The changes in growing cells are far less frequently seen than in dividing cells, but when the cells are watched on a warm stage the movements and changes of outline of the cytoplasm, nucleus, and nucleolus point to a disorganisation of the cell; in some cases the whole cell appears to go into solution in the surrounding medium. These studies are an important contribution to what we may call the direct action of X rays upon cell life. An extension of the work to other varieties of tissues can hardly fail to give valuable information upon lethal ratios for the dividing and growing cell. The bearing of such data upon therapeutic measures needs no emphasis.

TRAUMATIC MYOSITIS OSSIFICANS.

DURING the discussion on myositis ossificans traumatica, which took place at the Orthopædic Section of the Royal Society of Medicine, and which is reported on p. 1350 of our present issue, certain points were brought forward which are of the utmost importance to the general practitioner. The treatment of this condition was considered particularly from the point of view of its prevention. It is well known that this new formation of bone most often follows dislocations or fractures about the elbow in children; and whilst it cannot always be prevented, certain factors with regard to the causation are known. Following any injury about the elbow which involves tearing of periosteum, heavy massage, forced movements—erroneously called passive movements—or rough handling of the part are contra-indicated. The dislocation should be reduced, or in the case of fracture the displaced fragment brought into correct alignment by careful manipulation under anæsthesia. When there is a supra-condylar fracture, reposition of the lower fragment into correct alignment with the upper is the essential point. If this is attended to and rest enforced the result will be satisfactory, and full movement of the elbow-joint will be regained. The elbow should be put at rest in the flexed position by slinging the wrist to the neck. This method of fixation was originally described by Hugh Owen Thomas in the seventies of the last century, under the term "gauge halter." No physical treatment should be attempted for ten days, after which the sling is lengthened and the elbow allowed gradually to extend so long as the patient retains the power to regain the flexed position voluntarily. If the power of voluntary flexion is lost, the elbow should again be flexed for a few days by shortening the sling, after which it is again gradually allowed to extend. Gentle massage may be employed after ten days, but no deep kneading is to be permitted. No attempt must be made to regain movement rapidly, as for example by forced movements under anæsthesia. In the early stages such manipulation will result in greater stiffness rather than in increase of mobility, and there is in addition a grave danger of setting up the process of new bone formation in the muscles—myositis ossificans.

The importance of rest rather than movement after an injury in the neighbourhood of the elbow, especially in children, cannot be over-estimated, and its value is not sufficiently appreciated. For whilst recovery of function is regained by rest, the development of bone the production of myositis ossificans is a definite risk, which is run if force be employed. If myositis ossificans has resulted from the injury the treatment called for is again complete rest of the limb. No massage or movement must be permitted, but the elbow should be fixed in a sling in the position of flexion. The new bone will gradually become absorbed. A series of lantern slides were shown at the meeting, illustrating the complete absorption of the new bone in the course of a few months' rest. No operation should be undertaken to remove bone for at any rate six months, and until rest and fixation has had a long trial. Whilst the removal of an osteophyte blocking movement in a joint will often succeed, the results of operation on true myositis ossificans are poor. Any question of operation should be postponed for a long period, and only undertaken after careful examination, when the main mass has been absorbed and the remaining part is dense and incapable of natural absorption. Even at this late stage the results of operation are disappointing.

BITEMPORAL CONTRACTION OF THE FIELDS OF VISION IN PREGNANCY.

VARIOUS writers during the last 20 years have observed a certain degree of contraction of the visual fields on the temporal side during the late period of pregnancy. Dr. G. E. de Schweinitz, in his recent Bowman lecture,[1] on certain ocular aspects of pituitary body disorders, referred to this subject. He stated that out of 13 unselected cases of gravid women admitted to a maternity department in nine cases there was a definite contraction on the temporal side of the field from 15° to 40°. He also referred to a research on this subject by Dr. Maud Carvill, of Boston, Mass., more elaborate than any other on record. The completion of this research is now published.[2] Out of an unselected number of gravid women, the progress of whose pregnancies was normal, the visual fields were examined in 100. In the case of 12 of them the examination was conducted more than three weeks before parturition, and in their case no contraction of the visual fields was observed. On the other hand, among the remaining 88, in whose case the examination was made within three weeks of parturition, only five cases had normal fields, while the remaining 83 cases showed bitemporal contractions of greater or less extent. In 22 cases it was marked (20° or more); in 50 cases it was moderate (10° to 20°); in 11 cases it was slight (5° to 10°), contractions under 5° being taken as not outside normal range. After parturition in the great majority of cases the fields showed complete recovery. In 51 of the cases examined post partum all but two

[1] Proceedings, Sect. B, vol. xcv., 1923.

[1] Trans. Ophthalmological Society, 1923.
[2] American Journal of Ophthalmology, November, 1923.

showed normal fields, an observation which accords with the experience of other observers. There seems no doubt that the cause of this phenomenon is an enlarged pituitary body pressing on the optic chiasma. That this enlargement actually takes place was shown by J. Erdheim and E. Stumme in 1909, who demonstrated the fact by the examination of 150 subjects.[3] They found that in women who had never been pregnant the average weight of the hypophysis was 61·8 cg., the maximum 75. In primiparæ the average was 84·7 cg., the maximum 110. In multiparæ the average was 106 cg., the maximum 165. After parturition there occurs a subsidence, but the increase in the number of cells is never entirely lost. The clinical investigation of Dr. Carvill shows a remarkable correspondence with these pathological observations.

THE V.A.D.'S.

THE vision at once conjured up to most of us by the well-remembered initials V.A.D. is that of devoted and skilful service, in the theatres, wards, and kitchens of hospitals and convalescent centres during the war by amateurs who gently insisted on making a valued place for themselves in ranks where professionals formerly held undisputed sway. It is inevitable, perhaps, that the duties and responsibilities of the voluntary aid detachments should seem of less importance in times of peace, but their activities must not be lost to the community for want of encouragement and organisation. Moreover, it is to be remembered that though the familiar white headdress and grey or blue frock stands out in our memory, the V.A.D.'s were not confined to one sex or to one service. It is gratifying that a scheme[4] for voluntary aid detachments to supplement the medical services of the Navy, the Army, and the Air Force in time of war has been approved by the Army Council. The medical services of the forces of the Crown are regarded as sufficient to meet ordinary peace requirements, but they lack certain reserves needed on either partial or general mobilisation. On the outbreak of war, therefore, these services will require the assistance of personnel of voluntary aid detachments. These reserves will be required for motor ambulance convoys, ambulance trains, general, naval, military and air force hospitals, auxiliary hospitals, rest stations, hospital ships, convalescent homes, command depôts, and entraining, detraining, embarking, and disembarking sick and wounded. The administration of voluntary aid detachments is vested in a joint council representative of the Admiralty, War Office, Air Ministry, Territorial Army Associations, Order of St. John, British Red Cross Society, and St. Andrew's Ambulance Association. The Council may authorise the appointment of committees in the United Kingdom or the British Dominions and may delegate certain powers to such committees.

Territorial army associations will be responsible for the enrolment and efficiency of voluntary aid detachments in close coöperation with the joint county committees or the body or bodies which train the personnel in their respective areas. The chief executive officer for voluntary aid detachments in any area shall be the county controller, whose duties include the organisation and maintenance of local detachments, the assumption of responsibility for the efficiency of members, the arrangements for periodical inspection and for preparations for mobilisation as indicated by the military authorities, and the rendering of returns to the appropriate office. As to enrolment a voluntary aid detachment may consist either of men or of women, but not of mixed detachments. Only British born subjects, including those of the Dominions, are eligible for enrolment. Every applicant on joining must sign a form of enrolment, and also an obligation to undertake service when called upon in the class and category in which he or she is enrolled. The following grades shall be considered officers: Controllers and assistants, commandants and assistants, medical officers, lady superintendents, quartermasters. Members of detachments will be divided into two classes: (*a*) mobile, (*b*) immobile. In the case of men the mobile members, who shall be between the ages of 19 and 40, must be prepared to undertake service with any portion of His Majesty's forces on mobilisation, either at home or abroad, in accordance with the regulations which shall be in force. The immobile members will undertake service within reach of their own homes, and must not be under the age of 18. Men enrolled for general service may be employed on any of the following duties: Stretcher-bearers, clerks, carpenters, mechanics, motor drivers, cooks, storekeepers or store accountants, radiographers, nursing orderlies, laboratory assistants, masseurs, sanitary orderlies, or any other related duties. All members must be thoroughly trained as stretcher-bearers, and a proportion must also hold certificates in home nursing, hygiene, and sanitation. Every member of a detachment must pass an annual efficiency test, and must attend the annual inspection. As to women members of detachments the regulations of mobile and immobile classes are identical with those governing the men. Women may be employed on any of the following duties: Nursing members, pharmacists, dispensers, radiographers, ward orderlies, hospital cooks, stewards, storekeepers, hospital clerks, ambulance motor drivers, dental mechanics, masseuses, laboratory assistants, optical assistants, telephone operators, and must, in most cases, have taken the certificates in first aid and home nursing.

Further information on qualifying certificates, registration, inspections, appeals, and training are included in the scheme, which is likely to revive and consolidate the interest in a movement which did so much to help us win the war. The offices of the Central Joint Voluntary Aid Detachment Council are to be at 80, Pall Mall, London, S.W., and its secretary is Lieut.-Colonel W. H. A. De la Pryme.

[3] Beiträge zur Path. Anat., xlvi., p. 1.
[4] War Office letter, No. 83/851, December, 1923.

TUBERCLE BACILLI IN THE URINE.

HOW often do tuberculous lesions of the kidney occur in patients suffering from pulmonary tuberculosis? Can tubercle bacilli be excreted in the urine by a kidney showing no evidence of tuberculosis? Dr. F. Bedo Hobbs has attempted to answer these and cognate questions in the November and December numbers of *Tubercle*. His investigation of the records of 1000 necropsies on patients dying of pulmonary tuberculosis at the City of London Hospital for Diseases of the Chest, Victoria Park, showed that in 162 cases, or 16·2 per cent., tuberculous lesions of the kidney were found. The findings of other observers, collected by Dr. Hobbs, showed an average of 16·9 per cent.—a remarkable confirmation of his own figures which are concerned with macroscopic examinations. He has also examined a small number of kidney sections microscopically, and has found signs of tuberculosis in 32 per cent. In only a very small percentage of his 1000 cases had there been any signs of renal tuberculosis during life, and only in five cases did the disease involve the whole of one kidney, causing widespread infiltration and ulceration. Among the 55 unilateral cases in his series, the right kidney was affected in 32, and the left in 23 cases. In 100 cases of pulmonary tuberculosis without urinary symptoms he examined the urine for tubercle bacilli, guinea-pig tests being carried out by Dr. S. Roodhouse Gloyne and Dr. D. S. Page. Positive results were obtained in six cases, and in one of the cases which came to necropsy a careful microscopic examination failed to reveal any evidence of tuberculosis of the kidneys, bladder, or genital organs. Presumably, therefore, the tubercle bacilli had been excreted by a healthy kidney. This is a most important observation, as it shows that the presence of tubercle bacilli in the urine is not necessarily indicative of tuberculosis of the urinary tract. With regard to the mode of infection

of the kidneys, Dr. Hobbs comes to the conclusion that the bacilli are usually carried there by the blood-stream and very seldom by the ureters or lymphatics. Although in several cases the lesions were confined to the cortex, in none was the medulla affected without tuberculous changes being found in the corresponding portion of the cortex. The lines of round-cell infiltration found connecting the cortical and medullary lesions suggested that there was a direct spread from the former to the latter, probably through the lymphatics. One of the main conclusions to which Dr. Hobbs comes is that just as tubercle bacilli may enter the body without leaving any lesion at the port of entry, so they may be excreted without producing any lesion.

PRICE AND UNIT VALUE OF INSULIN.

THE Medical Research Council announce that the retail price of insulin in this country is to be reduced by the manufacturers,[1] after Dec. 31st, 1923, to 12*s*. 6*d*. per bottle of 100 units. The price of this quantity since July has been 17*s*. 6*d*., and before that the price was 25*s*. A reduction of 50 per cent. has accordingly been made since insulin first came on the market nine months ago. This is to be attributed to the increased efficiency of manufacture and to the larger scale of production following the growing demand. It is of interest to compare the progressive reduction in price here with the corresponding fall in America. It must be remembered, however, that the American manufacture began some months before the British, that the demand and consequently the scale of production is larger there, and that advantages in respect of large slaughtering centres and lower cost of alcohol exist in America which are not enjoyed by the British firms. In April last the retail price in America, formerly higher, was 2*d*. per unit, or 2¼*d*. in an alternative dilution; the price here was 3*d*. per unit. The American price was then reduced to just over 1½*d*. per unit, and in July the British price fell to approximately 2*d*. per unit. A more recent reduction in America brought the price there to just under 1½*d*. per unit, and the new British price is 1½*d*. per unit.

Some further reduction in price may be found possible by the manufacturers in the course of time as the scale and therefore the economy of production increases. It is not, however, to be expected—apart from the possibility of new sources or methods being discovered—that the price can ever be brought to a low level. The manufacture of insulin on a commercial scale involves the collection of large quantities of pancreas in very fresh condition, the use of large amounts of alcohol, elaborate and delicate chemical operations requiring skilled supervision, and careful physiological testing at different stages. The cost of such items must remain high in a process which gives a small yield of the final product.

The manufacturers of the American insulin announce an increase of 40 per cent. in the value of the unit of activity, and quite properly give a scale of dosage for their product revised in accordance with this increase. This announcement makes it advisable to explain the relation of the American unit to that adopted in this country. The Medical Research Council were made aware in August of this year of the discovery of a divergence between the unit adopted in Canada and that adopted by the manufacturer in the United States. They gathered that a proposal was under discussion to remove this difference by raising the value of the American unit by about 40 per cent. At that time American insulin had for a period not been in use in this country, and investigation showed that, during the interval, the value assigned to the British unit had been rising gradually, until it had become so nearly equivalent to the Toronto unit that a very small further adjustment was needed in order to make it correspond to the higher value which, in due course, came into force for the American continent. The value of the unit employed for British insulin is, therefore, already the same as that of the newer and stronger American issue; the only difference between the two countries, in this direction, has been that the value of the American unit has been suddenly raised, so that revision of dosage is needed, whereas that of the British unit has been allowed to rise by small stages, so that dosage has, in practice, adjusted itself. Henceforward all the insulin available in this country will, as originally planned, be standardised to the same unit.

The reduction of price mentioned above has been made in spite of this enhancement in the strength of the unit, so that the total effective reduction in cost to the patient is much larger than appears from the figures of price revision.

[1] We are informed that Insulin "A.B." Brand (Allen and Hanburys, British Drug Houses, Ltd.) will be supplied from Jan. 1st, 1924, in (1) phials containing 5 c.cm. or 100 units or 10 doses at 12*s*. 6*d*. each, or (2) phials containing 10 c.cm. or 200 units or 20 doses at 25*s*. each.

TREATMENT OF MELÆNA NEONATORUM.

Melæna neonatorum would seem to be one of those conditions which were regarded as most alarming and refractory to treatment a generation ago, and which now are viewed with comparative equanimity. It is a curious fact that though the mortality from melæna neonatorum has shown a marked decline, and this decline is largely due to advances in treatment, our knowledge of the underlying causes is still very imperfect. About 30 years ago the mortality was said to range from 40 to 84 per cent. This mortality came down with a run when Guttmann in 1890 introduced gelatin, which was given by the mouth or by rectal or subcutaneous injection. There were, however, several objections to this treatment: the gelatin might contain the spores of tetanus, and though maternity hospitals might always have a stock of gelatin ready, the practitioner could hardly be expected to add it to his already overloaded equipment. A few years ago the Americans, Schloss and Commisky, advocated the injection into the subcutaneous tissues of the infant's buttocks whole blood taken from a vein in the mother's arm. In a paper in the *Schweizerische medizinische Wochenschrift* for Nov. 8th, Dr. R. L. Rochat, attached to Prof. G. Rossier's maternity hospital in Lausanne, has given an account of this procedure which he has found as simple as it is effective. All the equipment needed is a 10 c.cm. syringe. About 3 c.cm. of the blood aspirated from a vein in the mother's arm are injected into the infant's buttocks at once, before the blood has had time to coagulate in the syringe. These injections are repeated several times during the first day. It is not clear how such an injection acts, but it is probably no coincidence that all the substances which, on subcutaneous injection, hasten the coagulation of blood, contain protein. And although most proteins would doubtless have a beneficial effect when injected in cases of melæna neonatorum, it is obvious that few are available in an emergency, and the great merit of the procedure recommended by Dr. Rochat is its simplicity. Since 1904 there have been 20 cases of melæna neonatorum in his hospital where the treatment with gelatin has, since 1921, given place to transfusion of blood in the manner described. Only four of the 20 infants died, and in one of these cases there was not time even to attempt treatment. A generation ago it was assumed that syphilis and infection of the gastro-intestinal tract were the chief causes of this condition, but in 19 of the 20 cases there was no evidence of syphilis, and only in one case were there signs of septicæmia in the infant. In as many as eight cases the infants were born before term, but only in two cases had there been difficult labour to which the hæmorrhage might conceivably be traced. It is unsatisfactory that we still know so little of the underlying causes of melæna neonatorum, and it is a little disconcerting that our treatment, though successful, must still be regarded as empirical.

H.M. the King has become Patron of the Royal Society of Tropical Medicine and Hygiene.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

L.—THE TREATMENT OF EPISTAXIS.

IN order to understand the rational treatment of epistaxis, certain premises have to be borne in mind; such are the age incidence, the position of the hæmorrhage, and the ætiology of the condition. Rare in young children, its frequency increases from the age of five up to adolescence, when it is at its maximum; then gradually diminishes, to increase again with advancing years when it is seen in its gravest form. It is found more commonly in males than in females. The bleeding occurs from one of four positions, the commonest being in what is known as Little's or Kiesselbach's area; this is situated on the septum half an inch behind its anterior edge and a quarter of an inch above the floor. Quite 90 per cent. of all cases occur from this area, where there is a close anastomosis between the spheno-palatine, anterior ethmoidal, and a septal branch of the coronary arteries and their accompanying venules. The other three sites are: a spot on the septum opposite the anterior end of the middle turbinal; the anterior end of the inferior turbinal; and, as pointed out by Kelly, a profuse venous hæmorrhage may occur high up from the anterior ethmoidal veins, these veins anastomosing with the veins of the dura mater and with the superior longitudinal sinus. The ætiological factors are numerous and are best classified into local and constitutional.

Local Factors and Constitutional Factors.

The chief local causes are: traumatisms, accidental or surgical; ulcerations of various types; new growths—especially sarcoma and septal angeioma or "bleeding polypus"; certain nasal diseases, especially atrophic rhinitis and rhinitis sicca, in which crust formation occurs, the separation of these crusts, either automatically or intentionally, leading to excoriation and hæmorrhage. This crust formation, with its accompaniment of nose-picking, is one of the common causes of nose-bleeding in children, in whom epistaxis is also a symptom of the presence of adenoids; when unilateral and accompanied by a muco-purulent discharge it is usually the result of a foreign body.

Under *constitutional factors* we have to consider firstly, pathological states of the blood, the more important being hæmophilia, various anæmias—especially pernicious anæmia, leukæmia, lymphadenoma, splenic anæmia, infantile and adult; malaria, purpura, scurvy, and toxic jaundice. Another constitutional factor is associated with increased blood pressure or vascular congestion, either organic or temporary. Of the organic type, we get cardiac affections, particularly those causing engorgement of the right side of the heart with back pressure, cirrhosis of the liver, chronic renal disease, bronchitis, emphysema, and whooping-cough. Of the temporary causes the chief are: violent physical exercise, the epistaxis of puberty, and of the menopause. Epistaxis also occurs as a symptom in the early stages of certain acute infective diseases, such as typhoid, scarlet fever, influenza, acute rheumatism, diphtheria, measles, and German measles. It is also seen in rarefied air, as in mountaineering and aviation.

Local Treatment.

The treatment must be considered with regard to the cause. Where this is a constitutional one dependent on an increased blood pressure, it should be recognised that such bleeding is at first distinctly beneficial and may avert a cerebral hæmorrhage. Where, however, the bleeding becomes excessive or where there is no constitutional cause, in the first instance, certain household remedies may be applied—such as pinching the nostrils so as to press the alæ tight against the septum; this will stop the bleeding in a large percentage of such cases. Cold ice-swabs can be applied to the nose and the nape of the neck, and the feet placed in hot water, the patient being in a sitting position. These failing, the nose must be cleared of all blood-clot in order to ascertain the exact bleeding-point. A good light is necessary, either a frontal mirror to reflect the rays of an electric bulb or lamp, or, better still, a good photophore run from an accumulator. The nose should be sprayed with a solution of cocaine combined with 1 in 1000 adrenalin, not only for allaying the pain and discomfort of the examination, but also for its vaso-constriction properties. Hydrogen peroxide, 10 volume strength and used cold in a spray, is useful for cleaning out the clot and is also a hæmostatic. Usually the bleeding spot can be seen in the "hæmorrhage area" indicated and can be stopped after cocainisation by applying a flat cautery point at a dull red heat, thus sealing off the mouth of the vessel; or, failing a cautery, the application of a 50 per cent. solution of nitrate of silver, or of pure carbolic acid, on a probe with a small mop of wool, is usually effective. Care should be taken that only a very little of the solution should be used on the mop—just enough to touch the bleeding-point. The older methods of inserting into the nares a plug of wool soaked in perchloride of iron, tannic acid, &c., are to be deprecated, owing to the spreading of the solution with consequent damage to the delicate ciliated epithelium of the mucous membrane.

Should these methods fail, or not be applicable, two chief alternatives remain: either to pack the nose with a half-inch gauze plugging soaked in 1 in 1000 adrenalin solution, or the insertion and inflation of a distensible bag such as Cooper Rose's or Howard's—of these bags the latter has the advantage of not perishing easily and so can be always kept handy for use. Howard's bag has an introducer and with this it is passed into the nasal cavity, keeping well along the floor until practically the whole length of the bag has been introduced; it is then distended with a small bellows and a tap on the tubing of the bag is turned to prevent the air from coming out. The bag fills the whole nasal cavity and so by pressure prevents the bleeding. In 24 hours this bag is removed by opening the tap and allowing it to collapse, when it can be easily withdrawn without any danger of restarting the bleeding. Plugging with gauze has the great disadvantage that its removal in 24 hours is apt to restart the bleeding. This can be partially obviated by using gauze impregnated with adrenalin and soaking just before insertion in liquid paraffin; it is then not so apt to stick on removal.

Internal Remedies.

A hypodermic of morphia gr. $\frac{1}{4}$–$\frac{1}{3}$ has a marked beneficial effect, both as a hæmostatic and in quietening an excited and alarmed patient. Various hæmostatic sera for injection have been put on the market, but my experience has not been encouraging, and in a few cases disagreeable subsequent symptoms followed their use. The internal administration of calcium lactate has been advocated; all that can be said is that it does no harm and can be tried for the repeated hæmorrhages in the various blood conditions. Where pathological conditions exist on which the hæmorrhage is dependent these naturally have to be dealt with in order to avoid recurring attacks.

J. GAY FRENCH, M.S. Lond., F.R.C.S. Eng.,
Surgeon in Charge Ear, Nose, and Throat Dept.,
Royal Free Hospital.

Recent articles in this series are:—

XXXVI. Menorrhagia in Young Women without Gross Lesion, by Dr. J. S. Fairbairn. XXXVII. Chronic Arthritis, by Dr. W. H. Wynn. XXXVIII. Glycosuria in Pregnancy, by Dr. G. Graham. XXXIX. Flat-foot, by Mr. Blundel Bankart. XL. Medical Treatment of Early or Suspected Duodenal Ulcer, by Dr. J. A. Ryle. XLI. Retention of Urine, by Mr. J. Swift Joly. XLII. Treatment of the Neurotic, by Dr. Kinnier Wilson. XLIII. Blepharitis and Styes, by Mr. Affleck Greeves. XLIV. Internal Derangement of the Knee-joint, by Mr. R. C. Elmslie. XLV. Coeliac Disease, by Dr. R. Miller. XLVI. Varicose Veins, by Mr. Philip Turner. XLVII. Colles's Fracture, by Mr. Harry Platt. XLVIII. Pyelitis, by Sir J. Thomson-Walker. XLIX. Prolapse, by Mr. Beckwith Whitehouse.

Special Articles.

IMPERIAL CANCER RESEARCH FUND: SCIENTIFIC REPORT.[1]

THE Eighth Scientific Report issued by the Imperial Cancer Research Fund under the direction of the Royal Colleges consists of four reprints of papers published in various journals since the issue of the Seventh Scientific Report in 1921, and six hitherto unpublished communications. Dr. J. A. Murray, in a brief preface, points out that these papers fall into two groups. Those at the beginning of the Report deal with the behaviour and character of cells already cancerous. Dr. B. R. G. Russell's two papers on Carbohydrate Metabolism of surviving Normal Tissues and Tumours, Dr. W. Cramer's discussion of the Relation of Vitamin Deficiency to the Growth of Cancer, and Dr. A. H. Drew's two papers on Tissue Culture come into this category. Those in the second group deal with the induction of cancer: the changes which cells undergo in becoming cancerous. Dr. A. M. Begg's descriptive account of Infiltration in Tar Carcinoma heads this part and partakes partly of both categories. Dr. Russell's work on the Production of Tar Sarcoma and Dr. Murray's paper on Primary and Secondary Resistance to the Induction of Cancer are followed by Dr. A. Scott's monograph on Paraffin Dermatoses and Cancer in the Operatives of the Scottish Shale Oil Industry. The last-named paper is included in the Report because it embodies the results of an unintentional experiment on a large scale on the human subject, carefully observed and recorded over a long period. As the same favourable conjunction of material and observer is unlikely to recur it was deemed advisable to make an adequate permanent record of it widely available. Since the papers reprinted from various journals were for the most part noticed in our columns on their appearance, we propose to deal here only with some of those papers in a most comprehensive Report which are now issued for the first time. Among the most important of these is the survey by Dr. Cramer of

Dietary Deficiencies and the Growth of Cancer.

He points out that vitamins are often described as "growth substances" or "growth factors," because in their absence from the food a young animal such as a rat either completely ceases to increase in weight and size or the increase is retarded. If vitamins are essential for growth, as is so generally supposed, the possibility suggests itself of controlling the growth of cancerous cells by dietetic means in this way. Experiments along these lines, carried out by Drummond in 1916, yielded entirely negative results, and Dr. Cramer's observations confirm Drummond's results and show that they are applicable to all kinds of cancerous cells. If the premise is true that vitamins are necessary for the growth of normal cells, then there appears to be disclosed a fundamental biological difference between the factors controlling the growth of normal cells and of cancerous cells. Dr. Cramer's investigations, however, have led him to reject the generally accepted premise that the life and growth of normal cells are dependent on the presence of vitamins, so that in this respect no fundamental difference exists between normal cells and cancer cells.

The effect of vitamin deficiencies on tumour growth was studied in mice and in rats. In no case did a growing tumour recede, nor was its growth even arrested, as a result of withholding either vitamin A or B from the food either separately or jointly. The contrast between the effect of the vitamin deficiency on the tumour and on the animal itself was very remarkable. Tests were also undertaken to ascertain whether an abundant supply of vitamins has a stimulating effect on the rate of tumour growth when compared with a restricted supply of vitamins. The effect of adding an abundant supply of vitamins to the ordinary laboratory diet in the form of cod-liver oil and marmite is to produce a much more rapid increase in weight and stature of the host without in any way affecting the rate of tumour growth. There is therefore no reason to fear that an abundant supply of vitamins might be harmful to patients suffering from cancer. Since the continued growth of cancer cells in animals suffering themselves from vitamin deficiencies might be accounted for by postulating for cancer cells either an increased affinity for vitamins or the power to synthetise vitamins, experiments were performed to test this possibility, but no support for these theories could be obtained. It therefore appeared necessary to test the correctness of the premise that vitamins are necessary for the life and growth of every cell and to study the mode of action of vitamins, and this investigation was undertaken by Dr. Cramer with the collaboration of Dr. A. H. Drew and of Dr. J. C. Mottram of the Radium Institute. The results, published in THE LANCET and elsewhere, show that the fact that the life of a highly differentiated animal is dependent on the presence of vitamins in the food does not necessarily imply that vitamins are necessary for the life of all the cells of such an animal. A similar objection is raised against the deduction that vitamins are essential for "growth." The expression "growth" is popularly used to denote the increase in size of a young highly differentiated organism after birth. It is well known that anything that interferes with the general health of a young animal will retard its "growth" as measured by its increase in size and weight. One may therefore use the regular increase in weight or stature as an indication of the general good health of a young animal. But to interpret any deviation from the normal as indicating the absence of some factor essential for growth generally is not admissible. There is, therefore, a considerable gap between the experimentally observed facts and the generalisation, which has been drawn from them, that every cell requires vitamins for its life and growth. If all cells were dependent on vitamins one would expect a condition of functional decline or structural atrophy affecting all the cells. But the atrophy affects very specifically certain tissues or groups of cells, and what is more, deficiency in one vitamin affects one specific tissue, deficiency in another vitamin affects an entirely different group of cells.

The evidence is even more conclusive when we take the isolated cells of such a highly differentiated organism. Dr. Drew has been able to analyse the factors which are essential for the life and for the growth of the isolated cells of a rat. These factors cannot be replaced by vitamins. Moreover, one of these factors is very thermolabile, being destroyed by heating to 60° C. for 30 minutes. The other factor is set free or formed by normal living cells as the result of damaging them. In all these respects these factors differ from vitamins.

The Effect of a Deficiency in Specific Amino-Acids on the Growth of Cancer.

It seemed of interest to study in comparison with vitamin deficiencies the effect of a deficiency in the diet of a well-defined chemical substance which is known to be essential for the life of highly differentiated animals as a whole. Hopkins and Willcock showed in 1907 that the amino-acid tryptophane cannot be synthetised by the organism, but must be supplied in the food if an animal is to grow and to live. The total amount of tryptophane present in maize meal is very small and was proved by preliminary experiments inadequate to support the life of a rat. The dietary was identical with the basal ration given in the vitamin experiments, except that the casein was replaced by maize meal. The general effects produced by a tryptophane deficient diet in

[1] Taylor and Francis, Red Lion Court, Fleet-street, E.C. 1923. Pp. 42. Price 20*s*.

young rats are remarkably similar in many respects to those occurring in the absence of the vitamin B. But there are features which distinguish the later stages of this amino-acid deficiency quite sharply from the vitamin B deficiency. The hair falls out in patches after six or seven weeks of this diet, and after another eight to ten days there is an extensive œdematous condition extending over parts of the trunk and stretching the skin. Of the organs the most striking naked-eye change is presented by the pancreas, which is completely disorganised by œdema. Microscopic examination has only been made so far of the thyroid and adrenal glands. The adrenal gland shows no very distinct alteration; a very profound change was found, however, in the thyroid gland, and the morphological appearances of the thyroid gland taken in conjunction with the condition of the fur indicate that the absence of tryptophane produces a condition of hypothyroidism. There is, therefore, a very specific relation between this amino-acid deficiency and certain endocrine organs. The view that the thyroid needs a supply of tryptophane for its specific functional activity is confirmed by the fact that according to Kendall the active principle of the thyroid, thyroxin, is an iodine derivative of tryptophane. The same specific relation appears to exist between tryptophane and the pancreas. These specific lesions resulting from tryptophane deficiency have apparently not been noted before. The general significance of these observations is not considered in the report, the object of the experiment having been to establish the fact that although most, if not all, cells of the body require tryptophane for the building up of their protoplasm, there is a specific demand for tryptophane on the part of certain cells, and as the result of an inadequate supply specific lesions with specific symptoms.

If a tumour is transplanted into a rat which has been kept for several weeks on a trytophane-free diet, it takes and grows progressively, although not quite as rapidly as in normal rats. The rats were kept for three weeks on the special diet, so that a distinct deficiency in tryptophane was present, as shown by the loss of weight and subnormal temperature, by the time the tumour cells were implanted into the animal. The active proliferation of the tumour cells under these conditions is a very striking phenomenon. Another remarkable feature of these experiments was that the presence of the tumour aggravated the deficiency so far as the host was concerned, by accelerating the onset of the specific symptoms and the final decline of the host. The slight retardation in the rate of tumour growth which does occur is adequately accounted for by the severe pathological lesions which develop progressively in the organism of the host carrying the tumour. That progressive growth does occur under such conditions is more remarkable than that the rate of growth is not as rapid as in a normal host. The presence of a mass of rapidly growing tumour cells which are known to require a supply of tryptophane for the building up of new cells reveals a clear and significant difference between the deficiency of such a substance and the deficiency of vitamins. As we have shown, the presence of a tumour does not accelerate the onset of the symptoms due to the vitamin deficiency. The results of the tryptophane deficiency confirmed the conclusion that vitamins are not required by either normal or cancerous cells for their growth or their life.

Dr. Cramer adds some general conclusions on the relation of diet to cancer and on the biochemical mechanism of growth, which should receive careful study.

Dr. A. M. Begg gives an account of a histological study of the

Dissemination of Tar-cancer in Mice,

especially of the local spread of epitheliomatous growths produced by repeated application of coal-tar or extracts of coal-tar to the skin of mice; in all, 140 tumours were available for this purpose. The author demonstrates that dissemination takes place by way of lymphatics, blood-vessels, and also along nerve trunks; this last route is of interest from many points of view, and is fully discussed.

Dr. B. R. G. Russell describes an

Experimental Osteo-sarcoma of Rat.

This tumour occurred in an elderly female rat, one of the series of 40 animals which had been inoculated subcutaneously with tar once a week for 12 months. The inoculations ceased after this period, but the four survivors were kept under observation and examined at intervals. Six months later, the single rat remaining alive was found to have a hard but apparently tender nodule situated beneath the skin of the right groin, about the site where the tar inoculations had been done. During the next three weeks the tumour grew steadily and fairly rapidly, more than trebling its bulk in this period. Excision of the growth was performed under ether anæsthesia. Microscopically the tumour is a polymorphic-celled sarcoma containing bony particles and osteoid tissue. It is readily transplantable into normal rats, transplantation being usually successful in 60 or 80 per cent. of the cases: the daughter tumours grow rapidly, but many regress and disappear entirely after three or four weeks' growth. From the point of view of the experimental production of cancer, this case is of special interest because of the long interval, five and a half months, elapsing between the cessation of tarring and the detection of a growth.

Dr. J. A Murray discusses

Primary and Secondary Resistance to the Induction of Cancer.

Primary Resistance.—The researches on experimental carcinogenesis of the past ten years have familiarised pathologists with the constancy with which a continuation of the effective stimulation over a considerable time is essential to successful induction of cancer. This feature of the course of such experiments harmonises with the chronic character of the irritations which clinical experience of the disease in man and animals has shown to be nearly universal in those forms of the disease where such a nexus can be inferred. Taken in conjunction with the histological identity of the lesions, it gives us reasonable assurance of the fundamental identity of the processes involved in cancer as it occurs naturally and under experiment. The application of tar is the only method used to produce cancer in these experiments. The length of time which elapses from the beginning of tarring till real autonomous growth sets in shows great variation even in animals of the same species. In the mouse this interval may be as short as three months, or as much as 18 months, and in one experiment a mouse remained free from growth, although tar had been applied to the same area twice weekly for more than 18 months. The majority of mice, however, develop skin carcinomata within six to nine months of tarring applied twice weekly. The extent of the area painted appears to have little influence. Very similar results have been obtained by painting the whole dorsal surface of the animal (Deelman), or an area of a square centimetre (Fibiger and Bang), or less (Murray and Woglom). The frequency of the application, as might be expected, affects both the rapidity of induction and the percentage of success. Even a reduction from twice to once weekly prolongs considerably the interval necessary to produce cancer in mice. Deelman, by scarifying the skin of mice before treating them with tar, shortened the time necessary to produce cancer by roughly a quarter; this observation is in agreement with the work of Drew by the method of tissue culture on the mechanism of repair.

In the past one has been accustomed to regard the preparatory period of chronic irritation which precedes the development of cancer as occupied in a gradual cumulative removal of resistance on the part of the organism to the unrestricted powers of growth of its constituent cells. It is more likely that in

cancer the cell acquires new properties, exploitations of the normal cell activities, but acting in a new way with disastrous consequences to the organism. Two other features of the development of cancer under experimental conditions bear on this conception of the secondary character of the neoplastic transformation. The first is the discrete focal character of the process. Growth begins in isolated, usually minute, areas and not diffusely throughout the whole zone of application of tar. The second is the existence of a latent period, very little affected by continuation of the irritant, as indicated by Deelman's work, and emerging clearly from the deliberate experiments of Leitch and of Bang. These authors, working independently, stopped the applications after two, three, or more months in animals which had shown no proliferative changes or only slight hyperplasias, and found cancer appearing after a further interval at the treated site. In several instances the local hyperplasia had regressed and the skin had become smooth, and the new growth started in the otherwise normal but hairless area.

Secondary Resistance to Cancer Production.—The strict localisation of experimental tar-cancer to the area painted would lead one to expect that subsequent tarring of another area remote from the first would again result in the production of a fresh primary growth at the new site. Experiments of this kind frequently end prematurely by the death of the animal from intercurrent disease or from metastasis in internal organs from the first primary growth. For this reason, although these attempts have been carried out for more than two years, in more than 50 mice, in which experimental tar-cancer had been produced, in only three was the second tarring at all commensurate in duration with the first. In none of these mice was there any indication of proliferative changes at the second site. Taken by themselves, these observations are without significance, except incidentally, for the doubt they throw on the presumed predisposing action of age as increasing the liability to cancer, if no other factor be assumed to operate. The result of a similar trial in mice with spontaneous mammary cancer, however, increases the probability that these negative results are not fortuitous, but due to a real insusceptibility of the animals to the carcinogenetic action of tar. The tarring of 14 mice in which spontaneous mammary carcinoma had been removed by operation resulted in the growth of a tumour in only one animal.

Another experiment was carried out to see how long the first stimulation must precede the second in order to prevent the development of cancer from the latter. Only nine mice out of 50 used survived long enough to develop tumours. They had been painted twice weekly on the left shoulder with the ethereal extract of tar with which most of these experiments have been performed. Seven weeks after the beginning of the tarring, applications were begun on the right flank, unaltered hairy skin intervening between the two areas. In two mice carcinomata have developed at both sites and practically simultaneously. In four no growth has been produced at the second site, although in all but one which died early, tarring has been kept up for a period, as long as, or longer, than was necessary in the first instance. In three mice retarded development of a tumour was obtained at the second site.

Some of the peculiarities in the results of another experiment, planned originally to show the relative carcinogenic efficacy of the alcohol-soluble, and of the ether-soluble fractions of tar in comparison with the unaltered whole-tar, bear out this conclusion of a general systemic effect of the development of one primary growth, on the liability of the animal to develop another primary growth. The experiments show that the induction of a fresh primary growth after a first has been definitely established, meets with a very intense resistance, whether the first tumour be of the same parent tissue or another. The nature of this secondary refractoriness to the induction of cancer is obscure. It is not a resistance to growth, but is, apparently, an inability to react with cancerous proliferation to procedures which initiate it with certainty in normal animals.

The nature of this refractory state must be the subject of further investigation. The rarity of multiple malignant new growths in the same individual finds a rational explanation by it. Its greatest interest and importance, however, lies in the indication it gives of a systemic constitutional change in the organism in which cancer has developed, a change which, if it could be recognised with certainty and rapidity, would enable us to recognise cancer in its earliest stages, and could we produce it without initiating new growth, would place in our hands a rational means of prevention.

The last paper in the report is by Dr. Alexander Scott, Medical Examiner of Paraffin Workers for Scottish Oils, Ltd., on the

Occupation Dermatoses of the Paraffin Workers of the Scottish Shale Oil Industry.

This paper, which is illustrated by excellent photographs, is based on the experience of over 24 years' continuous practice in the centre of the Scottish Shale Oil Industry, and on the results obtained during the past four years in carrying out routine examinations at intervals of three months of every workman employed in the paraffin departments of the various works in which the refining of paraffin is carried out. Those employed in the paraffin departments suffer from various well-defined skin lesions, due entirely to their working among and handling oily paraffin in several of the stages of the process of refining. These "occupation dermatoses" occur in approximately 50 per cent. of the workmen engaged in refining paraffin; the lesions appear in a few weeks or months after beginning work in the paraffin departments, and persist to a greater or less extent throughout the length of employment as paraffin workers; they disappear (at least the less chronic types) in a short time after ceasing work among paraffin.

Occupation Dermatoses.—The skin lesions due to contact with oily paraffin in a crude or semi-refined state may be described as conforming to the following types, of which one only or several may be found on the same individual:—

Occupation Comedones.—The comedones occur in parts exposed to contact with paraffin products, especially over the flexures of elbows, posterior aspects of elbows, upper aspects of shoulder-joints, and occasionally over the knees. Their origin is purely mechanical, being due to obstruction of the sebaceous ducts with semi-solid paraffin substances, or to thickening of the superficial layers of the epidermis, causing obstruction of ducts.

Folliculitis—Peri-folliculitis—Follicular Dermatitis.—This is one of the most prevalent forms of skin lesion occurring among paraffin workers, and consists of destruction of the hairs and hair follicles as the result of a mild inflammatory reaction set up by the action of shale oils. The follicles become somewhat dilated and are filled with epithelial debris and dirt, so that they appear as closely grouped clusters of black points over the parts affected.

Dermatitis Pustularis.—Two types have been observed: (*a*) one in which the condition is characterised by the appearance of numerous small pustules over the anterior aspect of the body and limbs; and (*b*) one in which the pustular eruption is due to the breaking down of the typical papule, which is the most prevalent form of occupational eruption.

Papular Dermatitis—Erythema Papulare.—This is by far the most common type of skin lesion met with among the paraffin workers of the Scottish shale oil industry, between 40 and 50 per cent. of the workers being affected. It consists of an eruption of small rounded elevations of a reddish colour, varying in size from that of a small peppercorn to that of a small pea.

Erythema Simplex.—This consists of a mild hyperæmia in which the redness is distributed uniformly over the forearms. The first appearance is a slight blush, followed by a greater degree of redness, which in the early stages disappears on pressure, to reappear when pressure is withdrawn.

Dermatitis Erythematosa.—This is essentially a dermatitis venenata of a subacute or chronic type, due to the irritant action of semi-refined paraffin on the tissues of the skin over a lengthened period, for years in practically every instance. It represents a further extension of erythema

in which the congestion gradually merges into a chronic inflammation of the various layers of the epidermis and cutis vera, followed by induration, and, in the most advanced stages, by partial or complete destruction of small areas of the skin in the affected parts. The early appearances are first seen on workmen after continuous contact with paraffin substances for seven or eight years. The indurative stages become more pronounced as the periods of employment get longer. There is frequently a tendency to the formation of small, flat, scaly warts, usually oval or circular in shape, and a very important feature of chronic paraffin dermatitis, once the "warty stage" has been reached, is that the tendency towards the formation of epithelial hyperplasias may continue long after workmen have been removed from contact with paraffin irritants.

Epithelioma (Paraffin Workers' Cancer).—Epitheliomata as seen among the paraffin workers of the Scottish oil industry may be defined as epithelial growths followed by ulceration and necrosis of tissue, having their origin in the epithelial layers of warts or papules. This condition occurs in workmen about or over middle life, who have been paraffin workers for long periods—20 years or more. They usually arise from warts due to chronic dermatitis or the indurated papules already described, and therefore usually coexist with an advanced dermatitis erythematosa in which wartiness is a prominent feature, or with indurated papules of a simple nature. The usual appearance is that of a gradually growing epithelioma in the midst of a chronic indurated dermatitis with numerous simple warts or indurated warty papules, only one of which has become malignant. More than one epithelioma at one time seldom occurs on the same individual, though it is not uncommon for the same workman to have different growths at various times over a period of years. The warts or papules from which this condition arises have, as a rule, been present for many years in a benign form until the epithelial covering begins to proliferate more rapidly, with increasing growth of the primary lesion, until the characters of malignancy develop. Clinically, the epitheliomatous growth, as occurring in the Scottish oil trade, differs in no respect from that generally described in text-books, while microscopically it shows the same proliferation of epithelial cells forming cell-nests, with infiltration of the surrounding and deeper structures. The malignancy for a long time is not great, and the lymphatic glands do not become involved till a late stage; but this varies according to the situation, the glands being involved earlier when the lesion is situated on the scrotum than when the site is on the arm or forearm. The most common situations are on the back of the hands, lower third of forearm, and scrotum. It has been seen on the face at the outer and inner angles of the eyelids, the features of rodent ulcer being sometimes assumed. A point of importance is that, while the various forms of dermatitis and other skin lesions described are only got among the actual workers in or about the paraffin departments, cases of epithelioma have in the past been more prevalent among workmen in other parts of the various oil works, and under conditions in which there is not necessarily prolonged contact with or handling of oil, in any of the stages from the crude to the semi-refined and ultimate products. It has occurred in retortmen, labourers, and stillmen.

In all, 65 cases of paraffin epithelioma have occurred during the 22 years prior to Dec. 31st, 1921, and as far as possible the differentiation between paraffin pressmen (green shed workers) has been made, though it may be that some of those designated oil workers and labourers may actually have been paraffin shed workmen. In the oil works comprised under Scottish Oils, Ltd., there have been employed approximately 5000 workmen annually for many years, this number including oil workers, labourers, retortmen, and all forms of labour necessary in the distillation of shale and the refining of its products. It will thus be apparent that the cancer incidence is not high, being approximately 1½ per cent. in 22 years, or under 0·1 per cent. per annum.

Discussing the influence of the various constituents of oil shale in the production of dermatoses, the author concludes there is no sufficient evidence to incriminate any particular one, though he thinks it is possible that sulphur compounds may be the exciting cause, and he summarises the position thus: The various forms of dermatitis, whether papular, pustular, or erythematous, found among paraffin workers are due to direct contact with some chemical substance which, by the formation of warts and indurated growths, acts as a predisposing cause of epithelioma; the determining factor or exciting cause of epitheliomatous degeneration is, in common with all other forms of cancer, unknown. Length of service and personal idiosyncrasy are important predisposing causes. The paper contains a useful bibliography and much valuable information about the conditions obtaining in the Scottish shale oil industry.

SOME COMMON MOUNTAIN AILMENTS, AND HOW TO COMBAT THEM.

BY BERNARD HUDSON, M.D. CAMB., M.R.C.P. LOND.

I HAVE been asked to write a few notes for the benefit of those numerous people, who will be shortly spending their vacations in the Swiss Alpine resorts, as to how certain unpleasant complications of a Swiss holiday may be counteracted.

Mountain Sickness.

To take first what is usually known as mountain sickness, it should be mentioned, at the outset, that true mountain sickness does not occur until very high altitudes are reached. An interesting account of mountain sickness, and the sensations experienced at great altitudes—for example, 8000 to 20,000 feet—will be found in "Travels Amongst the Great Andes of the Equator," by Edward Whymper, where the effects of very high altitudes (and consequently low pressures) are carefully analysed as regards pulse, body temperature, breathing capacity, fatigue, and general sensations. What we are concerned with here, however, are the usual feelings of discomfort experienced by some people in ascending to a moderate altitude, and these are due to want of acclimatisation. As Turban has long insisted, everyone who comes up out of the lowlands into the high mountains has to go through a process of acclimatisation, even though he may not be aware that it is taking place. The following points should be remembered. As one ascends, the barometric pressure falls, and corresponding with the lower barometric pressure there is a fall in temperature. The humidity of the air, also, is much less, and the upper layers are very dry. Owing to the absence of water vapour, dust, smoke, and micro-organisms, the heat rays of the sun pass much more freely at high altitudes, and are very much more active; this is also the case with the light rays and the chemical rays. The radio-activity of the sun is greatest when the winter snow has fallen.

Upon the healthy person the general effects of altitude may be summed up as follows. The metabolism of the body is increased, the respirations and the pulse-rate are quickened, and the body temperature tends to be slightly higher than at sea-level; in other words, even at a moderate altitude, such as 4000 to 5000 feet, the usual height of a mountain resort, the rate of living is higher. Another point is that at sea-level the normal red blood-count is about 5 million corpuscles per cubic millimetre, and the percentage of hæmoglobin about 90; at an altitude of about 5000 feet, the blood in order to compensate for the diminished tension of oxygen in the air becomes richer in both red cells and hæmoglobin, the average red count at such an altitude being 7 million red cells per cubic millimetre, the hæmoglobin 100 per cent. or even more.

Thus, it will be understood that in order to get used to a high altitude the bodily functions have to become somewhat modified, and for this to be established a little time is required, varying from a few days for the ordinary healthy person to three or four weeks for those with less responsive power, or those who are definitely ill. Until the person is acclimatised there is a liability to feel a little discomfort; for instance, shortness of breath after exertion, palpitation, a feeling of oppression at night, sleeplessness, headache, and general malaise.

Persons, therefore, going out to Switzerland for strenuous winter sports, such as ski-ing, should take things somewhat easy to start with, and gradually accustom themselves to the altered conditions. To go

for long expeditions directly on arrival is foolish, and is looking for certain trouble. For a person of nervous temperament to do so may imperil the entire advantage of the holiday.

Sun-burn.

Bad sun-burn is not common in mid-winter, but it is a real danger to be reckoned with from February onwards. Sun-burn depends upon various factors, of which altitude is the most important; the higher one goes the more likely one is to get sun-burnt. New snow is more effective in producing this than old snow. On the unprotected, unpigmented, and unprepared skin of persons coming out from England, long exposures to the hot Alpine sun, combined with the glare from the snow, can cause very severe burns. There may be produced definite toxic symptoms and fever. The most simple means of preventing this is to grease the face; for this purpose cocoa-butter is good, and two other preparations, both of which are excellent protectives and can be obtained in Switzerland, are Secheyé cream and anti-lux.

Snow Blindness.

Snow blindness, like sun-burn, is more likely to occur with new snow than with old snow, and at higher altitudes rather than at lower ones. The eyes become very sensitive to light, and the lids may become puffy and cracked, and may be glued together with dried secretion and refuse to open. There is much lacrymation. The pain is acute, and the whole condition is one of extreme discomfort. It can, however, be easily guarded against by the simple measure of wearing the amber-coloured glasses suggested by the late Sir William Crookes.

Montana, Valais, Suisse.

HOLLAND.

(FROM OUR OWN CORRESPONDENT.)

The Medical Profession in Holland.

IN Holland there are altogether about 3500 medical practitioners—i.e., only 1 per 2000 inhabitants. As of this number only about 2700 are general practitioners, the remainder being specialists and medical "officials"—i.e., medical officers of health, military surgeons, &c.—it might appear from an English or American point of view that the Dutch general practitioner was overburdened with work, and that medical care leaves something to be desired. Such, however, is not the case, for it must be remembered that Holland is one of the most densely populated countries of Europe, and that the roads in this "flat" land are, generally speaking, good. Moreover, the Dutch population is fairly healthy, and people make relatively few calls on the doctor. Also medical fees are low, and a fairly large practice is required to produce an adequate yearly income. In general, a gross income of £1000 per annum is looked upon as an enviable one. The majority of general practitioners cannot command that figure, but there are, of course, exceptions. The ranks of the specialists are, as elsewhere, limited; and perhaps the most fortunate members of the profession are the clinical professors of medicine. The Government salary of about £750 to a medical professor is not in itself sufficient for a scientific worker without other source of income, but the majority of clinical professors are very much in demand as consultants, and may thus manage to double their income. For a consultation in his office a professor rarely gets more than £1, while the fee for an operation may be as high as £100 to £250. The bulk of operations are performed for £50 or less. The fees of general practitioners vary between 1*s.* 6*d.* and 10*s.* per visit; in the country a surcharge is made for distance and loss of time. The specialists' fees amount to about twice the general practitioners' fees.

The Panel Doctor in Holland.

In view of the recent panel crisis in England it might be of interest to give some data regarding medical fees in respect of sick-clubs in Holland. The old "Battle of the Clubs" has been brought to a decisive issue largely through the activity of the Dutch Medical Association, and a better understanding has been reached between the friendly societies and the doctors. Nevertheless, there still exists, here and there, something of the methods which Sir Clifford Allbutt stigmatised as "the obsolete practice of tongue, pulse, and bottle." The medical benefit is administered entirely on the capitation system. A draft Bill of a National Health Insurance Act was introduced into Parliament three years ago, but the changes it proposed were too far-reaching, and it was accordingly shelved. When this Bill was under discussion in medical circles a capitation fee of 7*s.* was proposed, in the first instance as a minimum, and finally as a maximum. At present the average fee paid by the sick-clubs in Holland amounts to about 5*s.* per head. The following table gives the itemised expenditure in 1922 of two of the largest Dutch sick-clubs, each comprising about 100,000 members. The one functions for the labouring classes of Amsterdam, the other for the miners in Limburg.

Money Disbursed per Head for Each Member of the Club.

Items.	Limburg. s.	d.	Amsterdam. s.	d.
Capitation fee, general practitioners	4	1	5	5
Medical specialist's services	1	2	1	2
Dentist's service	–	3	–	5
Various specialist services (e.g., X rays)	1	0	0	4
Capitation fee, dispensing chemists	2	10	3	3
Cost price medicines and surgical appliances	1	1	2	10
Costs of nursing in hospital	10	10	12	0
Transport cost of patients	0	3	0	1
Contribution to district nursing	0	2	—	
Fees to midwives	0	10	0	6
Costs of administration	1	0	1	8
Total	23	6	27	8

A study of the above table will show that the Dutch doctor has some cause to envy his English confrère in the matter of capitation fee.

Sodoku (Rat-bite Disease) in Holland.

Sodoku was first described by Miyake, and recent cases of this remarkable disease merit description, especially where they occur in countries in which the condition had not hitherto been observed. Altogether, six cases have now been described in Dutch literature (two in van Lookeren Campagne's dissertation, one by Hymans van den Bergh, one by Berckel, one by Cornelia de Lauge and L. K. Wolff, and now one by van Dijk). The earliest Dutch case is that of a man of 71 years, who has now been suffering from this disease for 20 years and who was diagnosed by Dr. Guldenarm after reading Miyake's publications. The latest case was recently described in the *Geneeskundige Gids* (the *Medical Guide*) by van Dijk (Rotterdam). A child became ill 14 days after it had been bitten during sleep by a rat. The bite was situated at the corner of the left eyelid, where two pairs of holes the size of a pin's head—caused by the rat-bite—were to be seen. In a fortnight's time an extensive red and hard œdematous infiltration round it extended to above the eyelid. In the throat region a little gland of the size of a bean could be felt, which was painful on pressure. There was no exanthema, temperature 39·9° C., pulse 140, leucocytosis (W.B.C.'s 15,000; polynuclear leucocytes, 85 per cent.; no eosinophilia). A little albumin was present in the urine, no sugar, much urobilin, Wassermann reaction negative. The fever fell slowly to normal in six days, to be followed by another attack (recurrent type). Each attack of fever was accompanied by exacerbation of local symptoms. Salvarsan was not without effect in this case, but it took three months before the patient was completely cured. The fact that the spirochæte of the sodoku type was not found was disappointing, but nevertheless, in this case the clinical diagnosis was convincing.

NOTES FROM INDIA.

(FROM OUR OWN CORRESPONDENT.)

Suggestions for Organised Research.

A CONFERENCE of medical men from almost all parts of India was recently held in Calcutta to consider how research in diseases could be made more effective. Among the recommendations made is one for the appointment of an impartial committee of medical men selected from among the leading surgeons and physicians in the United Kingdom to suggest methods by which research work throughout India may be coördinated to the best advantage. It was felt that if such a committee were appointed in India, it would be difficult to avoid the influence of local prejudices. There is at present little coördination between the workers in the different Indian provinces engaged in studying causation and methods of checking or eradicating disease, and the labours of workers in one province are not available for guidance to workers in another.

Pasteur Institute for Calcutta.

India already possesses three Pasteur Institutes for the treatment of hydrophobia. These are all situated in the hills, at Kasauli (near Simla), at Shillong, in Assam, and at Coonoor, in Southern India. As, however, experiments of recent years have shown that the vaccine used in the treatment of hydrophobia can be kept in the Indian plains without any danger of deterioration if sufficient care is taken, a proposal is shortly to be presented to the Government of Bengal to establish a Pasteur Institute also at Calcutta in connexion with the Calcutta School of Tropical Medicine. Experts who have examined the proposal are of the opinion that there is no reason why the vaccine should not be manufactured in Calcutta. The technical processes and the maintenance of a small staff under the charge of a medical expert are not expected to cost more than what the local government pays as its contribution towards the maintenance of the Pasteur Institute at Shillong. The establishment of an institute in Calcutta will not only prove more economical to the Bengal Government, but it will also mean a considerable saving in time and money to the sufferers who have now to spend large sums of money in railway fares and for expenses in Shillong during the fortnight's stay while undergoing treatment. The mercantile community in Calcutta, it is understood, will strongly support the proposal.

BRITISH PROVIDENT ASSOCIATION FOR HOSPITAL AND ADDITIONAL SERVICES.

Sir Alan Anderson presided over a dinner at the Savoy Hotel on Dec. 17th for the purpose of making the objects of the Association more generally known. The Chairman was supported by other members of the Executive Council—namely, Dr. J. F. Gordon Dill, Captain J. M. Gordon Dill, Mr. W. McAdam Eccles, and the Hon. Sir Arthur Stanley. Lord Dawson was unable to be present.

The guests included Dr. H. B. Brackenbury, Mr. L. G. Brock, Mr. J. Courtney Buchanan, Dr. C. Buttar, Major Crawley, Mr. Ward Cook, Dr. Alfred Cox, Mr. T. Denman, Mr. F. B. Elliott, Sir William Hale-White, Mr. N. Bishop Harman, Sir Thomas Horder, Sir Robert Kindersley, Sir Walter Lawrence, Mr. H. Lesser, Colonel Levita, Mr. Cecil Lubbock, Sir Edward Marshall-Hall, Mr. R. Holland Martin, Dr. E. C. Morland, Mr. E. W. Morris, Sir Thomas Neill, the Hon. Cyril Ponsonby, Mr. J. F. P. Rawlinson, M.P., Lord Riddell, Lord Somerleyton, Mr. H. S. Souttar, Mr. H. J. Waring, Major Wernher, Dr. R. McNair Wilson, and the Representative of THE LANCET.

Mr. E. W. Morris, in proposing The Association, said that it would benefit the voluntary hospitals, the public, and the general practitioner. Voluntary hospitals originally founded as shelters for the sick poor had now become armouries for fighting disease, and the cost had crept up to £5 a week per bed. The new departments which had constantly to be added were not earning departments, and the hospitals had only four alternatives. They could go back to the £2 per bed standard by cutting off the new departments and reducing the nursing; they could close beds; they could be nationalised; or prospective patients could be asked to contribute small amounts when well to cover in whole or in part the cost of their treatment when ill. For the manual worker there had been founded a Hospital Saving Association which helped groups with an average health-rate to obtain definite hospital services. The British Provident Association was a similar institution intended to benefit the "black-coated poor," who, as a rule, had not been considered eligible for hospitals. Under the scheme of this Association the subscription varied from £1 1*s.* per annum for a single person to £1 11*s.* 6*d.* for a married couple and £2 2*s.* for a family. On the recommendation of the patient's own private doctor he would obtain the advantages of hospital research, and of special treatment such as massage, and he would be admitted to hospital on the recommendation of the consultant whom the general practitioner had called in. The Association would pay £3 3*s.* for a consultation and £1 per week to the hospital towards the patient's cost, or a similar amount to a selected nursing-home. Contributions would be made for surgical appliances, dental treatment, and dentures. Should home nursing be required, 1*s.* 6*d.* a visit would be paid, while radium treatment and an ambulance service were also available. The scheme would enable the general practitioner, especially in country districts, to fight disease with modern weapons.

Sir Alan Anderson, in reply, said the problem was a simple one. The hospitals were a great health factory and as they extended their expenses increased. There was an immense mass of people getting good wages who wanted to be kept in health and yet preserve their spirit of independence. The British Provident Association was really an assurance association to help these people. It was desired to secure the support of large city firms who would introduce the scheme to their staffs and would also take a share of the expenses, following the example of Sheffield, where he was told 96 per cent. of the large firms supported the Hospital Saving Association and paid a third of the full hospital cost to their men.

Sir Arthur Stanley, in proposing The Guests, paid a tribute to Dr. Gordon Gill for his initiative and ability. Lord Riddell, Sir Edward Marshall-Hall, and Mr. J. F. P. Rawlinson, M.P., replied.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Comdr. J. H. L. Page is placed on ret. list.

J. Wolstencroft and T. C. H. Neil to be Surg. Lts.

ROYAL ARMY MEDICAL CORPS.

The undermentioned Majs. to be Lt.-Cols: C. G. Thomson, vice Lt.-Col. A. L. Scott, ret. pay; Bt. Lt.-Col. A. McMunn, vice Lt.-Col. E. B. Knox, ret. pay.

Capt. F. P. Freeman retires, receiving a gratuity.

The undermentioned temp. Capts. relinquish their commns., and retain the rank of Capt.: E. A. Tozer and R. W. Shaw.

Capt. E. G. Foley retires, receiving a gratuity.

The undermentioned temp. Capts. relinquish their commns.: W. L. Hay, and is granted the rank of Maj.; J. A. Marsden, and retains the rank of Capt.

ROYAL AIR FORCE.

Flight Lt. (hon. Squadron Leader) J. N. MacDonald is granted the acting rank of Squadron Leader whilst so employed. Flight Lt. J. W. Harper is transferred to the Reserve Class D 2.

Maj. C. M. Rigby, R.A.M.C., and Capt. H. D. C. Rankin, R.A.M.C., have been appointed surgeons to H.E. the Commander-in-Chief in India.

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE following table gives some of the principal health statistics for 1922 of a group of towns, differing much in circumstances and local government standing :—

Name of town.	Estimated population (R.-G.).	Birth-rate.	Death-rates per 1000 of the population.				Death-rates per 1000 births.		
			All causes.	Tuberculosis.	Cancer.	Respiratory with influenza.	Infant mortality		Maternal mort. in childbirth.
							Legit.	Illegit.	
Chester	41,190	20·9	13·8	1·2	1·3	3·6	72	184	9·2
Oldham	148,300	19·3	15·8	1·3	1·2	3·9	100	177	2·8
Great Yarmouth	56,700	19·3	12·9	1·3	1·2	3·0	84	118	1·8
Walsall	99,890	25·4	12·9	1·5	1·0	3·4	94	120	3·5
Darlington ..	66,710	22·6	14·1	1·4	1·0	3·4	94	143	3·3
Nuneaton ..	43,401	24·4	9·8	1·1	0·8	2·1	(78)*		5·6
Dover	40,390	20·5	11·4	1·0	1·3	2·6	52	68	3·6
Llanelly	37,800	20·6	11·3	1·2	1·1	2·8	79	154	2·6
Macclesfield ..	32,886	18·7	15·3	1·2	1·5	3·0	66	75	1·6
Gravesend ..	31,540	23·7	12·9	1·2	1·5	2·7	50	150	5·6
Chelmsford ..	20,990	17·9	11·2	0·8	1·5	2·0	38	182	0·0
Stretford ..	47,530	16·0	11·5	0·9	1·2	2·5	68	69	6·8
Weston-super-Mare	25,070	14·1	12·2	0·8	1·2	2·5	36	136	2·8

*Undivided infant mortality.

City of Chester.

Dr. D. Rennet reports that housing needs were not met by the 37 new houses provided, so that conditions are, if anything, worse than last year. The prospect is better at present, "but the limitations imposed by the labour and material available will not allow the rate of building to overtake the need for many years." Half of the pneumonia cases investigated were sleeping four or more in a room. There was only one notification of poliomyelitis and the experience of the orthopædic clinic is that this disease is overlooked during the feverish stage and only comes under notice when deformity is marked and cure long and difficult. Dr. Rennet deplores the fact that the Ministry have cut down by one-half the estimate for the cost of the treatment of non-pulmonary tuberculosis at the Chester Royal Infirmary and the Orthopædic Hospital, Oswestry. A sample of liquid eggs taken informally from a bulk supply was found to contain 82·6 gr. of boric acid per pound.

County Borough of Oldham.

Dr. J. B. Wilkinson says the principal item of the year's work has been preparatory to dealing with the larger of the two slum areas. Housing scarcity has prevented renovation and has enabled certain persons to profiteer by charging exorbitant rents for furnished rooms. Financial circumstances, owing to bad trade, have also prevented owners from undertaking improvements. The corporation completed 300 houses during the year and private builders 18. In response to a deputation of property owners, the Health Committee agreed to suspend the conversion of privies during the year. Dr. Wilkinson mentions that the permissible limit of black smoke from the chimneys of boiler furnaces is a liberal one, and that there were no prosecutions. He, however, tells us that the use of electricity for power is being extended, and he opines that this and the use of gas and smokeless fuel for heating "will enable future generations in Oldham to see the sun more frequently than the present one."

County Borough of Great Yarmouth.

Dr. A. N. Stevens draws special attention to the fact that 45 per cent. of the deaths of Yarmouth residents occurred at ages over 65 and 23 per cent. at ages over 75. All the dwelling houses, except 24, are supplied from the company's mains with water obtained from Ormesby Broad and the River Bure and subjected to sand filtration. There are still 24 wells, many of these "without doubt liable to pollution at times, but unless the samples for analysis happen to be taken at one of those times they cannot be dealt with." One would have thought, however, that if the surroundings of a well showed it to be liable to pollution it would be possible to get it closed. The maternity and child welfare report shows that of over 1000 infants visited 75 per cent. were breast-fed at the fourth month. An unusually high proportion of the births in Yarmouth are attended by medical men, about two-thirds in 1922.

County Borough of Walsall.

Owing to the death of Dr. H. Shore, the report is submitted by Dr. James A. M. Clark, acting medical officer of health and tuberculosis officer, who issues a serious warning as to the large number of unvaccinated children in the borough. Dr. Clark draws attention to the marked increase in the death-rate from pulmonary tuberculosis. The increase was most marked among females in the age-group 25–35 and also occurred amongst males in the age-group 35–45. Dr. Clark thinks the increase is due to the trade depression. Colloidal calcium has been tried extensively and appears to have given good results in children and in early cases in adults, but no very definite deductions can be drawn.

County Borough of Darlington.

Dr. S. G. Mostyn tells us that there is still great need for new houses, though private enterprise is beginning to supply the need. The work of the V.D. clinic has been greatly improved by the appointment in May of Dr. W. H. Brodie as a full-time officer. Dr. Brodie gives four days a week to this work and the remainder of his time to the school medical service. Six centres were opened during the year for the provision of free meals for school children; 295 children attended and 53,438 meals were supplied. The diet was approved by the school medical officer and the head of the domestic subjects centre. The school dentists ask for facilities for the administration of general anæsthetics and also suggest that they might give a lecture on the teeth, with the mothers present, in each school once a year.

Borough of Nuneaton.

Dr. K. E. Tapper submits very complete reports on the public health and school medical services, which, it is to be hoped, many of the residents will read. Situated on the Warwickshire coalfields, Nuneaton's chief industry is coal, textile industries coming next in importance, and providing female employment. There are, says Dr. Tapper, good provisions against distress in time of unemployment: a good water-supply (the new supply from Thornton reservoir near Leicester is nearing completion), good sewerage, an atmosphere free from gross smoke pollution, and no slums. Many of the births take place under adverse circumstances, and 44 of the 83 infant deaths occurred in the first four weeks of life. A maternity home and ante-natal clinic are needed. Midwives attend 94 per cent. of the births and are being asked, in return for a small fee, to do some ante-natal work. Dr. Tapper would like to see the control of the midwives under the authority responsible for child welfare. Amongst other needs mentioned are the conversion of privies (when the new water-supply is completed), the provision of a V.D. clinic in Nuneaton, and the extension of the school dental service (at present attention is almost restricted to the temporary teeth). Dr. Tapper has a good deal to say about personal

hygiene, and instances the need for the education of the public in the right choice of food and the fact that some of the new council houses are suffering from indifferent tenants.

Borough of Dover.

Dr. A. B. McMaster refers to the high case-mortality from diphtheria. Five of the seven deaths were those of children admitted to hospital after the third day of the disease and some of these lives might have been saved by the use of antitoxin at an earlier stage of the disease. There is insufficient provision both for advanced and early cases of pulmonary tuberculosis, and the under-nourished pre-tuberculous child is an urgent problem. Owing to the continuance of unemployment there was a greater call on the milk scheme for the necessitous, 353 individuals being assisted, as compared with 294 in 1921. This assistance was, however, valuable in keeping down infant mortality.

Borough of Llanelly.

Dr. Laurence W. Pole reports that considerable improvements are being made in the milk-supply. The health committee have visited every cowshed and dairy in the town, and a most unsatisfactory state of affairs was found. Dr. Pole also comments unfavourably on the milk shops and methods of distribution, but anticipates that the report for 1923 will record a great improvement as the result of the operation of the Milk Act of 1922. Scavenging arrangements leave much to be desired. The regular removal of house refuse has been interfered with by the removal of trade refuse. Back lanes are universal, and it is a custom of old standing for householders to deposit their refuse in them. Strenuous action is needed to stop this objectionable practice. The number of houses now completed under the Government-assisted scheme is 462, but Dr. Pole estimates that 1000 more are needed to replace old property and deal with overcrowding. The need will be even greater when trade is normal. The work of the maternity and child welfare and school clinics has been hampered by unsatisfactory premises, but this will be remedied by the removal of both to specially adapted accommodation at the old town hall. Lessened unemployment has meant less call on the free milk scheme. A large number of school-children suffer from malnutrition and much of this is due, Dr. Pole thinks, to the wrong choice of food and the inadequate use of milk. Nothing is done for the children's teeth and the appointment of a school dentist is a very urgent need.

Borough of Macclesfield.

Dr. J. Hedley Marsh says the problem of housing gains yearly in importance and urgency. Wages are not high in Macclesfield, and Dr. Marsh would like to see houses provided, in rows if necessary, at a rental of 4*s.* or 5*s.* a week all included. "Until this is done the house shortage will continue," he says, "and, in trying to provide the ideal, we shall perpetuate the slums." Maternity and child welfare work has hitherto been chiefly in the hands of the voluntary workers of the Public Health Society with their headquarters at Hurdsfield House, and we gather from the report that the town council have just appointed their first two health visitors, who hold the dual qualifications of trained nurse and midwife. A considerable portion of the report is devoted to detailed bacterial analyses of the water-supply. The principal gathering ground of the town's water is in the uplands, beyond Langley, and is in some danger of pollution by farms. There is also a private supply with two small sand filters for houses in Hurdsfield-road, which Dr. Marsh would like to see abolished. The analyses refer to both and are put on record to let the committees concerned know the facts and to establish bacterial standards for comparison in future years. Dr. Marsh thinks the present pollution with intestinal bacteria may be eliminated by the acquisition of farms on the gathering grounds.

Borough of Gravesend.

Dr. C. D. Outred tells us that there is no provision for advanced tuberculosis and suggests that the town council might combine with adjoining districts to make such provision. A motor ambulance is also wanted. The question of overflowing cesspools has caused much expense and trouble. The corporation took the unusual course of deepening the cesspools at their own cost. The total cost of deepening 147 cesspools was £914. The previous cost of emptying these cesspools was £3880, and it is estimated that £2966 has been saved in the first year by the deepening operations. Twenty-two loads of chalk were removed at a cost of about £13 from one cesspool which cost £341 to empty in the previous 12 months, and it is possible that this cesspool will not require emptying for two or three years. The 96 houses erected by the corporation on the King's farm estate are all occupied and permission to sublet has been granted in 32 cases. Private enterprise has only erected six houses, and Dr. Outred thinks arrangements should be made with builders to erect 250 more houses on the corporation estate, to be let at a moderate rental. In the school report Dr. Outred refers at some length to the opposition of parents to minor operations and even to conservative dentistry. He hopes that the teachers may be able to give much assistance in wearing down this opposition.

Borough of Chelmsford.

Dr. Richard H. Vercoe submits the report for 1922, though Dr. William J. Cox was medical officer for the first six months and Dr. J. F. MacDonald acting medical officer for the second six months. The water-supply has to be cut off for part of the day in the summer months and the corporation is promoting a bill to obtain an additional supply from the Chelmer at Sandford Mill. Considerable progress has been made with the housing scheme, 176 houses having been completed during the year. In addition to this, private enterprise contributed 29 houses. In Chelmsford there are many houses in a bad state of repair. Dr. Vercoe mentions 130 as only fit for demolition, and 300 more which can only be kept habitable by constant repairs.

Urban District of Stretford.

Dr. William J. Heslop presents his thirty-sixth and farewell report and gives an interesting contrast between the conditions prevailing at the time of his appointment and now. The general death-rate has declined from about 15 to 11, the infant mortality-rate from about 160 to about 60, and the population has increased from 21,000 to 47,530. In 1887 there were many cellar dwellings and back-to-back houses, and the conveniences were mostly privy middens. All these have disappeared and many other sanitary improvements have been carried out.

Urban District of Weston-super-Mare.

Dr. John Wallace reports that there has been no unusual or excessive mortality during the year and that the infant mortality-rate was the lowest ever recorded. The new houses erected during the year numbered 59, 18 being municipal houses. The sanitary inspector states that apart from municipal houses there is no increase of accommodation for the working classes, and that owing to shortage of such houses proper renovation cannot be carried out and overcrowding cannot be dealt with. The abattoirs belonging to the council are the only slaughter-houses in the district and are in first-class condition. Humane killers are used for cattle and pigs.

PENALTY FOR IMPROPER CHARGES TO PANEL PATIENTS.—The result of the recent inquiry by the Ministry of Health at Tottington, Lancashire, respecting alleged improper charging of fees from insured persons by two local panel doctors was communicated to the Bury Insurance Committee on Dec. 11th. The communication states that the Ministry has decided that £1000 must be withheld from the supplementary grant payable to the Insurance Committee (Lancashire) in respect of medical benefit, and that this sum, together with the costs incurred by the committee in connexion with the inquiry, should be recovered from the practitioners by reduction from their remuneration or otherwise; arrangements should accordingly be made by the committee to recover the amount by instalments spread over a suitable period. The committee should also take steps to secure that a refund is made by the practitioners in all cases in which it is established to the satisfaction of the committee that fees have been irregularly charged by them.

Correspondence.

"Audi alteram partem."

ON SOME USES OF DIGITALIS.

To the Editor of THE LANCET.

SIR,—I am anxious to comment as briefly as possible on certain statements which Dr. G. A. Sutherland makes in THE LANCET of Dec. 8th under the above heading. Dr. Sutherland opens with a confession of unbelief; he says: "Claims are made that the contractile power of the heart muscle can be improved and increased by the direct action of drugs," and a few lines further he proceeds, "I am one of those humble unbelievers who has hitherto failed to find any drug which will act directly and beneficially on the cardiac power of contraction." It is a tremendous and sweeping pronouncement, and, as a firm believer in the power thus called in question, I would, in equal humility, make my profession of faith on the following grounds:—

In the first place, anatomy shows the heart to be richly supplied with nerve fibres, cerebrospinal and sympathetic, which bring it into touch with every part of the body. What do those fibres convey? Stimuli. What is asked of the heart in response? Contractile power, in quantity greater or less according to the circumstances which condition life; in other words, the power-output has to be adapted to the needs of the occasion. In physiologic life, then, stimuli play a recognised part, influencing directly the muscle fibres of the heart, now restraining, now reinforcing, and now regulating the contractions in their sequence. Let us now introduce the drug to the body; it is, ex hypothesi, possessed of properties capable of influencing the tissues; otherwise it would be inert and not a drug. Let us suppose an attack of fainting, the face is blanched, the pulse cannot be felt, and that we apply strong ammonia, secundum artem, to the nostrils. The colour returns to the face, the pulse to the wrist, the patient revives. In this case the powerful stimulus of the ammonia has been projected from the mucous membrane of the nasal cavities, viâ the central nervous system, upon the heart, and the heart has responded with a crescendo of systoles: it is a sequence as direct as the firing of a train of gunpowder issuing in the terminal explosion. A dose of brandy or of ammonia by the mouth, before the faintness had advanced quite so far, would have given like results, but in that case the projection of a stimulus from the mucous membrane of the stomach would have been followed by stimulant effects after absorption into the blood-stream.

Imagine next a case of intense collapse, the result of snake-bite, and that, according to the method of Prof. G. B. Halford, we inject the dose of ammonia directly into a vein; the success claimed for this method is most simply explained as a direct action upon the heart muscle as the drug passes through the chambers of the heart first, and subsequently is circulated through the coronary vessels. Advancing the argument a step further, let us perfuse the excised heart of a frog, by means of a Roy-apparatus, with an artificial blood, recording the systoles upon a revolving drum, and then introduce a suitable dose of an ammonium salt into the circulation; almost at once the stimulant effect is observed in the increased height and breadth of the series of systoles which now are traced. In this case the action could not be more direct, for all question of nerve influence is put aside, and if the ligature securing the heart to the perfusion cannula be properly placed in the auriculo-ventricular sulcus there remains only the ventricular walls *to be influenced*, and the medicated blood, within the ventricle, *to influence* them—the action could not be more direct nor the effect more unmistakable. To complete the evidence I would refer to Dr. Carl Bodon's paper, in THE LANCET of March 24th, on "The Intracardiac Injection of Adrenalin." In the directness of this method it comes nearest to the foregoing experiment, with this difference, of course, that the heart is here in situ with all its communications intact. The adrenalin was injected directly into the right ventricle, and though the full portraiture of systemic death was present before the dose was administered (unconsciousness, cessation of respiration and heart's action, death-like pallor, widely dilated pupils with loss of corneal reflexes, and involuntary voiding of stools and urine), within a few seconds the heart beat reappeared, and in less than half a minute became regular and effective. In this case, the circulation being to all intents and purposes at a standstill, what else but direct action of the adrenalin upon the inner surface of the right ventricle, the walls of which still held somatic life, can explain the result? Dr. Bodon's paper is based upon a material of 90 cases of intracardiac injection.

I pass to another point which I can only deal with very briefly: it concerns the type of case for which digitalis is suitable, which we are told has *now* been achieved (p. 1222, the italics are mine). The type is that which is most commonly spoken of as auricular fibrillation, and we are told that on this subject the teaching of Mackenzie "is now universally accepted," and that he has shown "that the benefits to be obtained from digitalis are more strikingly seen and more hopefully expected in cases of auricular fibrillation associated with rheumatic disease of the heart than in any other condition." I think there will be none to dispute that this is par excellence the type of case for digitalis, but have we had to wait till *now* for this knowledge or were we well acquainted with the type of case, which indicated digitalis, 40–50 years ago? Did we not know the case characterised by heart failure with rapid irregular action of the heart, the irregularity being both in time and force and yielding a very striking and easily recognised pulse; its common association with valvular disease, and very particularly with mitral disease, regurgitant, obstructive, or both the one and the other; its tendency to develop dropsy more or less widespread, up to a condition of almost complete waterlogging of the whole body; the frequent history of rheumatic antecedents, either in the patient or in the family history? Were not such cases pointed to as of the type calculated to convince the most hardened sceptic as to the value of drugs (as Dr. Ringer used to teach) in their astonishing response to digitalis? Did not Dr. G. W. Balfour lay down in most careful terms the rules which should guide the dosage of digitalis in this type of case? True, we did not know the state of flickering asystole of the auricle which obtained, but we knew its outcome, the delirium cordis, which was present, and we knew how to treat it effectively. The term auricular fibrillation tells us nothing as to the nature of the disorder which follows upon it; the symptoms declare this and the symptom-group sums up the *dis*-order; and the symptom-group we knew.

It is not doing justice to the facts of the case or to the memory of those observers in the past, who in respect of the use of digitalis have deserved so well of us, to withhold the expression of our indebtedness.

I am, Sir, yours faithfully,

Dec. 11th, 1923. HARRINGTON SAINSBURY.

THE PREVENTION OF BILHARZIASIS.

To the Editor of THE LANCET.

SIR,—So far as the commoner carriers of *Schistosomum hæmatobium* and *S. mansoni* are concerned, complete drying of pools for a few days at a time, as recommended by Prof. R. T. Leiper, is undoubtedly the most effective means at our disposal for eradicating these fresh-water snails. In the intense heat of the tropics, where evaporation is great, the animals soon die in their dry shell. But the menace of the mollusc

in the marsh remains, for I have shown that in the moist heat of the Natal coast *Isidora tropica* from the Free State can live in the shade on a dry shelf for 48 hours and become active again when returned to fresh water. Moreover, by means of its operculum, the common intermediary host of *Schistosomum japonicum* is able to resist drying, the enclosed animal remaining moist within its shell for several weeks and emitting numerous cercariæ, as shown by W. W. Cort, as soon as it is returned to fresh water. Although I have never found schistosomes in an operculated shell in South Africa, the majority of the cercariæ with which they are infested being encysting forms, I have recently isolated them from a new family of fresh-water snail, *Barnupia*, and this mollusc is better able to resist drying than the majority of non-operculated shells, because of its very close attachment to reeds, whereby it also withstands the rush of a flooded river. The presence of living fresh-water molluscs in the lagoons that are formed at the mouth of Natal rivers does not alter the fact that the vast majority of intermediary hosts are quickly destroyed by sea-water, and the occasional salinity of lagoon water helps to keep them from accumulating in places where they might otherwise tend to breed in considerable numbers.

I am, Sir, yours faithfully,

F. G. CAWSTON, M.D. Cantab.

West-street, Durban, Nov. 23rd, 1923.

THE MEDICAL EXAMINATION OF MOTOR DRIVERS.

To the Editor of THE LANCET.

SIR,—Is it not now desirable that drivers of taxi-cabs and motor vehicles should be examined medically with respect to their ability to safely perform their duties? The possibility of serious accidents through the physical incapacity or ailments of a taxi-cab driver must have occurred to most people who have ever thought about the subject. I was much impressed some time ago when consulted by a taxi-driver who presented marked symptoms of affection of the nervous system. He admitted that it was no longer safe for him to drive a motor vehicle. He had a definite history of syphilis, and after careful examination I came to the conclusion that he was suffering from early general paralysis. His list of collisions with pedestrians (some serious) was already a long one, and I urged him to discontinue his occupation at once. I never saw him again, but he was still driving a taxi-cab a considerable time after he consulted me. When we consider the accidents that might happen through the driver of a motor vehicle having an epileptic fit, or an attack of petit mal, angina pectoris, or syncope, or cerebral or other severe internal hæmorrhage over and above those that might result from defective sight or hearing, it is strange that medical examination has not been required long ago.

Accidents cannot be prevented so long as motor vehicles are allowed to rush along our streets and roads at their present speed, and the increasing mortality from motor accidents is the price we pay, without protest, for the pleasure of this rate of travelling. But pedestrians at least deserve some consideration and protection, and medical examination of all who drive motor vehicles would do a little to diminish the number of accidents; it would also be a warning to the motor drivers and serve to remind them of the dangerous weapon in their hands.

Personally, I have no interest in such examinations except as a pedestrian.

I am, Sir, yours faithfully,

Dec. 14th, 1923. R. T. WILLIAMSON.

*** At a recent inquest a London coroner pointed out very forcibly that under present conditions anyone of the scheduled age, though blind, epileptic, or physically defective, can obtain for 5*s*. a licence to drive a motor vehicle. Plainly this risky state of things must be considered when the law affecting motorists is revised. And time presses.—ED. L.

Obituary.

PROF. ROBERT TIGERSTEDT.

Robert Tigerstedt, whose death we have briefly announced, was born in 1853 at Helsingfors. A Finn both by birth and sentiment, Tigerstedt studied at his native university, in Stockholm and in Leipzig. In 1876 he was appointed assistant in the physiological laboratory at Helsingfors, and in 1886 he became professor of physiology at Stockholm. In 1900, when Finland was going through difficult times politically, his patriotism impelled him to return to Helsingfors, where he was appointed professor of physiology, and where he remained until his death. He was one of the many distinguished physiologists who were pupils of Carl Ludwig. Tigerstedt's scientific work, which is very extensive, falls into three main groups—namely, the physiology of muscle and nerve, the physiology of the circulation, and metabolism. Some of his papers on muscle and nerve were translated into English for the "Biological Memoirs on the Physiology of Muscle and Nerve and the Electrical Organ," edited by Burdon Sanderson. At one time he took much interest in the alcohol question from the abstinence point of view. His early researches were on stimulation of muscle through its nerve, but perhaps he received earliest recognition through his lectures on the circulation of the blood which contained much new and historical matter, including the fundamental and classical researches of Stannius, of Rostock, on the heart. To later readers in this country and America his "Text-book of Human Physiology," translated from the third German edition by Prof. J. R. Murlin, of New York, in 1906, is the work by which he is best known. In later years he carried out researches on respiration and metabolism, and contributed monographs to Nagel's "Physiology," to Oppenheimer's technical treatise, and to the "Comparative Physiology" of Winterstein. His "Lehrbuch der Physiologie des Kreislaufs" is well-known as an authoritative statement on the circulation of the blood, and a second edition is in process of appearing. A recipient of many honorary degrees, he was a member of the Scientific Academies of Helsingfors, Upsala, Stockholm, Copenhagen, and Christiania, and in his sixtieth year a bronze medal was struck in his honour. Tigerstedt has been editor of the "Skandinavisches Archiv für Physiologie" since 1898. The forty-third volume of these archives was dedicated to him as a memorial on his seventieth birthday by his friends and pupils. At the last Physiological Congress before the war, in 1913, it was decided to hold the next Congress in Paris with Tigerstedt as its president. His judgment and his knowledge of physiology were greatly esteemed by his colleagues in all countries, and as a man he was loved by a large circle of friends.

GEORGE PESTER CHAPPEL, M.D. CAMB.

ON Dec. 15th the death occurred, at his residence, Altrincham, Cheshire, of Dr. G. P. Chappel, aged 55, one of the best known medical practitioners in the

district. Death was due to pneumonia, after only a few days' illness. Dr. Chappel was the son of the late Canon Chappel, of Camborne, Cornwall. After studying at Cambridge and the London Hospital, he graduated at Cambridge M.B., B.Ch. in 1892 and M.D. in 1896. He was for a time house physician and later house surgeon to the late Sir Frederick Treves at the London Hospital, afterwards he practised at Tottenham, and came to Altrincham about 15 years ago. There, in addition to carrying on the work of a large private practice, he was medical officer of health for Bowdon and hon. physician to the Altrincham General Hospital. During the war Dr. Chappel, as Major in the R.A.M.C. (T.), served in Egypt, and later had charge of a large military hospital in London.

SYDNEY STEPHENSON, M.B., C.M. EDIN., F.R.C.S. EDIN., D.O. OXF.

Sydney Harry Stephenson, who died at his residence in Welbeck-street, London, on Dec. 15th, aged 61, was son of the late Dr. Appleby Stephenson, and was educated privately at Nottingham High School, afterwards entering Epsom College. He studied medicine at Middlesex and St. Mary's Hospitals, and having qualified L.S.A., he graduated at Edinburgh University in 1884. In 1889 he obtained the Fellowship of the Royal College of Surgeons of Edinburgh. Devoting himself to the study of ophthalmology, he held successively the posts of ophthalmic surgeon to Queen Charlotte's Hospital, to the Evelina Hospital, to the King Edward Memorial Hospital, Ealing, and at the time of his death was consulting ophthalmic surgeon to the Queen's Hospital for Children.

Stephenson rendered a great service to the community by his work on trachoma. He was in charge for two years of the "ophthalmia" school at Norwood, established after a serious outbreak in the London schools during the summer of 1886. Here all the children found to have granular lids were segregated, their teaching being in the hands of a resident governess. Other experiments on similar lines were made in the following years. In 1890, after an outbreak of trachoma at the Metropolitan Poor-law Schools at Hanwell, an isolation block designed for 400 children was erected, and Stephenson's services were engaged to look after their ocular condition. The proportion of trachomatous children in the Hanwell schools gradually diminished from 33 per cent. in 1889 down to 0·6 per cent. in 1896. In the latter year Stephenson was asked by the Local Government Board to undertake an inspection of the whole number of children attending the metropolitan Poor-law schools, when he found 973, or 5·72 per cent., suffering from trachoma; his recommendation was adopted to house these children in a couple of hospital schools on the "cottage" or "small block" plan.

When the Oxford Ophthalmological Annual Congress was formed by the late R. W. Doyne in 1909 out of the Oxford ophthalmological meeting, Stephenson was unanimously elected as secretary. In that capacity, with Doyne as Master, he laid the foundation of the Congress well and truly, and when, some five years later, he succeeded Doyne in the office of Master, a post he held to the day of his death, he established himself at once as a great successor to the brilliant founder. Under his mastership the Congress grew in membership and popularity, and it must have been a matter of deep satisfaction to him that the last Congress in July of this year, at which he presided, was a record one in attendance and keenness. His older colleagues will remember him as one of the most frequent contributors to the discussions at the Ophthalmological Society (of which he was secretary, later vice-president) for some 30 years. He was also a member of the Société Française d'Ophtalmologie, an hon. member of the Midland Ophthalmological Society, and an hon. Fellow of the American Academy of Ophthalmology and Oto-Laryngology. He had an extraordinary capacity for work as was evidenced in the publication of some 14 volumes of the *Ophthalmoscope*. This latter journal afterwards became incorporated in the *British Journal of Ophthalmology*, of which Dr. Stephenson was one of the associated editors. He was the author of "Ophthalmic Nursing," which has gone through three editions; "Epidemic Ophthalmia: Its Symptoms, Diagnosis, and Management," published in 1895; "Eyestrain in Everyday Practice," published in 1913; and, with Mr. W. A. Brailey, he wrote the article on Diseases of the Iris and Ciliary Body in the "System of Diseases of the Eye," published in Philadelphia in 1897. He also contributed to the Encyclopædia Medica, and made translations of Dr. Feuer's "Die Beziehungen zwischen Zahn- und Augen-Affectionen," and of Dr. Darier's "Leçons de Thérapeutique Oculaire."

Although an able clinician, Dr. Stephenson's chief interest was in journalism. He wrote well and with great care. He spoke well, weighing his words with a view to their effect, and whether he showed cases or wrote papers, they were always finished products. His knowledge of men and an unusual memory for faces, combined with a genial bearing and energy, were invaluable assets to every society in which he played a part. In a scientific meeting he was in his element and thoroughly enjoyed himself, making others do the same. He was a man ever ready to help and to do so in a way so unobtrusive that it was often not until long after that the source of the help was realised. Stephenson's health was never good. For long partially crippled, his last years were quite incapacitated, but with amazing pluck he stuck to his work when others would have given in to overwhelming disability.

Dr. Stephenson married Jane Finch, daughter of Mr. J. H. Peck, J.P. for Southport and Wigan.

ROBERT WALMSLEY FISHER, M.D., B.CH., D.P.H. (R.U.I.)

BY the recent death of Dr. R. W. Fisher, Director of the Vaccine Institute, Belgaum, in his forty-ninth year, the Public Health Department of Bombay has lost one of its most indefatigable and devoted workers. Dr. Fisher, son of Mr. Thomas Pentland Fisher, was born at Ballymena, co. Antrim, Ireland, in 1874. He began his medical studies at the Royal University of Ireland, and graduated M.B., B.Ch. in 1901. After holding appointments as resident medical officer of fever and small-pox hospitals in Belfast, followed by a short experience of general practice, he offered his services to the Secretary of State for plague work in India. He was allocated to the Punjab, and served in the Punjab Government for about four years. On his return to Ireland he took the D.P.H. (R.U.I.) in 1909. In 1911 the Secretary of State sanctioned the creation of an appointment of director of the Vaccine Institute, Belgaum, which was offered to Fisher in recognition of his services. During the war Fisher acted, in addition, as civil surgeon to Belgaum, and as medical officer in charge of the hostile women's camp, Belgaum. In 1921 his thesis on the History and Work of the Vaccine Institute, Belgaum, for the M.D. Belfast was awarded a gold medal, and was published in the *Indian Journal of Medical Research* (vol. viii., No. 2, 1920). As a tribute to his enthusiastic and painstaking labours for the Vaccine Institute he was awarded the Kaisar-i-Hind medal in June, 1923. In his various spheres of work Fisher was genuinely admired, not alone for his ability, but as a man of generous heart and disposition, ever ready to promote and foster good fellowship and to spend himself in the interests of others. He leaves a widow, a daughter, and two sons, the elder of whom has just entered on his studies in medicine at the Royal University of Ireland.

PRESENTATION TO PROF. ALEXIS THOMSON.—In the surgery class-room of the Edinburgh University on Dec. 12th an antique silver basin, with inscription, was presented to Prof. Alexis Thomson, who has been forced through illness to give up the chair of Surgery, by the members of his last class, and others of his students who cared to contribute, as a token of esteem and regard.

Medical News.

UNIVERSITY OF OXFORD.—In a Congregation held on Dec. 15th the following degrees were conferred :—

D.M.—M. E. Shaw, New College.

B.M., B.Ch.—O. D. Ballinger, University; D. T. Barnes, St. John's; A. M. Cooke, Jesus; R. S. Creed, Trinity and Magdalen; Alice E. Harding, Oxford Home Students; L. N. Jackson, Balliol; J. A. Macfadyen, Brasenose; G. F. L. Mitcheson, Christ Church; T. L. Ormerod, Queen's; T. S. Townsend, Jesus; and H. F. Turney, Magdalen.

The following candidates passed the Final Examination for the degrees of B.M., B.Ch., in the subjects named :—

Materia Medica and Pharmacology.—C. P. Blacker, Balliol; W. H. Bradley, Christ Church; H. A. Byworth, Oriel; J. N. C. Ford, Hertford; A. T. Fripp, Christ Church; A. H. Gale, Trinity; C. L. Harding, Christ Church; G. G. Hill, Hertford; H. O. Hopkins and T. C. Hunt, Magdalen; J. S. Jerome, Christ Church; M. J. W. Minshull, Keble; J. S. Rake, Brasenose; C. E. Roberts, Jesus; J. de la Mare Savage, Wadham; J. G. S. Thomas, and O. R. Tisdall, Hertford; A. L. Wilkinson, Trinity; K. G. Norton, St. Hugh's; and J. M. Vaughan, Somerville.

Pathology.—L. J. Barford, Queen's; C. P. Blacker, Balliol; R. B. Bourdillon, University; W. H. Bradley, Christ Church; C. S. Broadbent, Queen's; R. V. Facey, Brasenose; L. N. Jackson, Balliol; T. L. Ormerod, Queen's; R. A. Walsh, Magdalen; O. B. Buckley, Somerville; and E. J. Cockram, Society of Oxford Home Students.

Forensic Medicine and Public Health.—G. R. P. Aldred-Brown, Keble; W. H. Bradley and R. E. D. Cargill, Christ Church; A. D. Dyson, Corpus Christi; C. L. Elgood, Balliol; D. R. Gawler, University; C. A. H. Green, Trinity; L. N. Jackson, Balliol; W. J. E. Lupton, New; H. A. Robertson, Balliol; V. P. Robinson, St. John's; B. G. Scholefield and I. M. Sidley, Christ Church; B. E. Thompson, Brasenose; G. I. Wilson, Queen's; and A. E. B. Harding, Society of Oxford Home Students.

Medicine, Surgery, Midwifery.—O. D. Ballinger, University; D. T. Barnes, St. John's; A. M. Cooke, Jesus; R. S. Creed, Magdalen; L. N. Jackson, Balliol; J. A. Macfadyen, Brasenose; G. F. L. Mitcheson, Christ Church; H. A. Robertson, Balliol; B. G. Scholefield, Christ Church; E. B. Strauss, New; T. S. Townsend, Jesus; H. F. Turney, Magdalen; A. E. B. Harding, Society of Oxford Home Students; and J. Orr-Ewing, Lady Margaret Hall.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—At a meeting of the Council of the College on Dec. 13th, Sir John Bland-Sutton, President, in the chair, the secretary reported the death on Nov. 8th, at the age of 73, of Mr. William Harrison Cripps, past Vice-President and member of the Council; and also the death on Dec. 7th, at the age of 70, of Sir Frederick Treves, Bt., past member of the Council and of the Court of Examiners. A vote of condolence was passed in each instance. Diplomas of Fellow were conferred upon the following 25 candidates who have passed the requisite examinations and complied with the by-laws :—

Douglas J. Batterham, Cambridge and St. Bart.'s; John M. Bickerton, Cambridge and King's Coll.; Harold C. Brayshaw, Edinburgh and London; Leonard G. Brown, Oxford and London; Calvert M. Carruthers, Kingston and London; William D. Doherty, Guy's; William C. Faull, St. Mary's; Lionel R. Fifield, London; William D. Hart, Otago and London; Reginald W. P. Hosford, St. Bart.'s; Michael V. Hurley, Cork and London; S. Kadinsky, Westminster and Guy's; Hugh B. Kent, Guy's; John R. Lee, Melbourne and Middlesex; Hugh J. McCurrich, St. Bart.'s; S. M. Majumdar, Calcutta and St. Bart.'s; William E. M. Mitchell, St. Bart.'s; Thomas S. North, St. Mary's; Norman A. M. Petersen, London; Granville D. Robertson, St. Mary's; William G. Rose, St. Mary's and St. Bart.'s; Thomas C. Summers, London; Clement P. Thomas, Westminster; Dallas B. Walker, Otago and Edinburgh; and Owen H. Williams, Edinburgh and Liverpool.

Licences in Dental Surgery were conferred upon the following 119 candidates who have passed the requisite examinations and have complied with the by-laws :—

F. G. Alford, Royal Dental; H. W. Alliso, Birmingham; Katherine M. Ambler, Royal Dental; S. Bain, Sheffield; G. A. Ballantyne, London; R. C. Ballard, Guy's; E. T. Barlow, Liverpool; O. J. Barrable, Royal Dental; T. S. L. Barritt, Guy's; M. Batey and M. L. Bendi, Royal Dental; T. B. Berry, Guy's; A. D. Blackwell and W. M. Bowler, Royal Dental; W. S. Brittan, Guy's; C. F. S. Brooks, Manchester; J. K. R. Bryce, Univ. Coll.; L. S. Carter, Guy's; G. R. Catchpole, London; H. F. Caudwell, Royal Dental; E. F. Cook, Birmingham; W. O. Cooksey, D. H. Couch, and I. G. Coutts, Guy's; E. R. Cozens, London; Florence E. Crampton, Royal Dental; D. J. Dalton, Durham; Brenda M. Daniels, Royal Dental; W. W. F. Dawe, Univ. Coll.; H. T. Deubler, Royal Dental; R. C. De Waal, London; J. A. Dodds, Manchester; F. S. Duck, London; H. B. Dumughn, Manchester; A. H. Dyke, Guy's; C. D. W. Eddowes, London; R. W. Ellis and Doris M. Elvy, Royal Dental; C. H. A. Fido and E. H. Fouraker, Guy's; E. W. F. Fowler, Royal Dental; L. A. Freeman, London; S. G. French, Guy's; N. H. Galloway, Birmingham; H. C. Goadby, Edith A. Gower, N. J. Graham, Helen M. Greatorex, H. R. Griffin, W. D. Guyler, and H. W. Haggett, Royal Dental; L. F. Handford, Guy's; F. E. Harrison, Liverpool; O. J. Henry, Leeds; C. N. Hilton, London; C. E. H. Ockley, Royal Dental; W. V. A. Hodges, Guy's; D. S. Hotz, Royal Dental; F. B. Howarth, Manchester; E. T. Hughes, London; F. Innes, Durham; P. Johnson, London; L. H. Jones, Guy's; F. Kogan, Royal Dental; G. A. Lawson-Brown, Guy's; E. H. Lewis, Sheffield; C. D. Lingwood, Guy's; E. A. Lister, Univ. Coll.; J. E. Lloyd, Guy's; G. W. Lund, P. Lunt, and A. P. Marais, Royal Dental; R. S. Matthews, M. W. Meskin, and H. Metheringham, Guy's; L. E. Montgomery, Royal Dental; A. L. Morgan, Bristol; A. E. Nelson, Guy's; W. R. Norris, London; L. Nurick and W. Orsmond, Guy's; S. H. Partridge and Muriel C. Patching, Royal Dental; E. Z. C. Pearson, Guy's; H. D. Peckover, Royal Dental; F. O. E. Peres, Univ. Coll.; C. R. Philp, Royal Dental; E. V. Potts, Guy's; H. Prior and R. H. Reece, Royal Dental; E. R. Rich, Univ. Coll.; P. W. Rogers, London; R. A. Roth and C. H. Rubra, Royal Dental; N. H. Saint, Guy's; O. Samson, Royal Dental; E. H. L. Sander and S. S. Sanderson, Guy's; R. Schlimmer, Guy's; J. W. Schofield, Royal Dental; G. P. Stanfield, Birmingham; W. H. P. Stone, Univ. Coll.; G. S. Sturgess, G. H. Tapper, G. E. Taylor, and E. D. Thomas, Royal Dental; L. J. Threlfall, London; T. Vallange, G. J. van Schalkwyk, and C. A. Wakeford, Guy's; A. E. Ward and A. W. T. Ward, Univ. Coll.; E. M. Ward, Birmingham; V. C. Warr, Guy's; E. C. E. Williams, Birmingham; H. Williamson, Royal Dental; L. C. Willis, Guy's; F. G. B. Wilson, Durham; and J. M. Wolfe, Royal Dental.

Diplomas of M.R.C.S. were conferred upon the following :—

Miriam P. de Villiers, Royal Free; and H. C. Suri, Punjab and London.

A report was read from the Board of Examiners in Dental Surgery announcing, among other things, that the Board had considered an application from King's College Hospital Medical School for the recognition of a School of Dental Surgery in connexion with that medical school which had recently been established; the Board recommended the Council to add King's College Hospital Dental Department to the list of dental schools recognised for the course of study for the licence in dental surgery. This report was adopted.—Mr. V. Warren Low was re-elected a Member of the Court of Examiners.—Mr. W. G. Spencer was re-elected a Member of the Central Council for district nursing in London for three years from Jan. 1st, 1924.—Sir Berkeley Moynihan was reappointed a Member of the Court of the University of Birmingham for three years from Jan. 1st, 1924.

UNIVERSITY OF LONDON: *University College.*—Six scholarships and exhibitions are available for award to students of the Faculty of Medical Sciences entering the College in October, 1924. The value of these scholarships and exhibitions is not less than £40 a year each, tenable in some cases for three years, and, in the case of the Bucknill Scholarship, for the whole period of medical education. The value of any of these scholarships or exhibitions may be increased by the grant of a supplementary bursary if the circumstances of the scholar or exhibitioner make such a grant necessary.

UNIVERSITY OF LIVERPOOL.—At examinations held recently the following candidates were successful :—

DEGREE OF M.D.

J. Flanagan and Annie A. Muir.

DEGREES OF M.B. AND CH.B. (HONOURS).

Class II.—B. Ordman (distinction in Surgery).

FINAL EXAMINATION FOR DEGREES OF M.B. AND CH.B.

Part III.—R. L. Blair, I. Casdan, M. Cohen, N. B. Cooke, J. C. Drummond, Kathleen Edgecombe, C. K. D. Edwards, D. Flenley, E. J. Foley, S. C. Goldstone, A. B. Griffiths, R. C. Gubbins, A. J. Hawe, C. W. Healey, F. H. Jones, W. F. Jones, A. Kefalas, T. S. King, Ruth Lunt, G. H. Mann, J. I. Noble, D. U. Owen, Eleanor M. P. Pearson, R. A. Roberts, G. Sanders, J. R. A. Tallack, Elizabeth M. Theron, J. G. Thomas, R. W. Thomas, H. Walker, and A. E. Wall.

Part I.—*A. T. Ashcroft, *C. A. Birch, J. M. Brodrick, N. Cresswell, H. L. Cullen, P. V. Dillon, L. Earlam, Sybil O. Edwards, W. Emdin, C. J. S. Garton, I. Gordon, A. J. Goss, Frances M. Greenhalgh, Catherine E. I. Greenshields, Gwyneth Griffith, C. A. Harris, Beryl M. Hawthorn, J. C. Heal, R. E. Horsfall, F. Hughes, Elvy I. Johnstone, S. M. Katz, B. D. Knoblauch, B. Krikler, Sarah Leigh, L. J. A. Loewenthal, T. R. E. Longton, *G. McNichol, E. Martinez, K. N. Mawson, J. Morrissey, Winifred A. Nicholson, G. W. Paton, H. Peaston, J. W. Reid, Kathleen M. Robertson-Dunn, *Miriam Roskin, J. C. Ross, F. B. Shevlin, Ruth Simpson, Margaret E. Thomas, R. S. Turner, C. E. Unsworth, J. Unsworth, Rosalind Vacher, and F. W. Yates.

* Distinction in Pathology.

Part II.—C. P. Allen, A. Ashworth, C. Baxter, T. Bellis, D. Cohen, H. A. Cole, E. Cook, J. D. Craig, O. Dawood, H. Duff, J. H. Gilchrist, L. F. Henry, T. S. L. Jones, Rebecca Katz, A. L. Kerr, B. D. Knoblauch, B. Krikler, E. Martinez, J. R. Mitchell, and R. S. Turner.

DIPLOMA IN TROPICAL MEDICINE.

B. Abelman, Winifred M. Edghill, N. D. Fraser, R. Lee, E. R. Peirce, C. B. B. Reid, A. E. Richmond, and J. B. Steven.

SMALL-POX IN ENGLAND AND WALES.—A further increase in small-pox has occurred. Sixty cases were notified in England and Wales during the week ended Dec. 8th in the following sanitary areas: Cheshire 1 (Chester); Derbyshire 24 (Alfreton 1, Bolsover 5, Heanor 4, Blackwell R.D. 14); Gloucestershire 16 (East Dean R.D.); Northumberland 1 (Morpeth R.D.); Notts 14 (Hucknall 7, Kirkby-in-Ashfield 3, Basford R.D. 4); Yorks, W.R. 4 (Adwick-le-Street 3, Bentley-with-Arksey 1).

REMUNERATION OF INSURANCE PRACTITIONERS.—The Court of Inquiry appointed by the Minister of Health and the Secretary for Scotland to consider the question of the remuneration of Insurance practitioners held a private meeting on Dec. 13th at the Ministry of Health, and considered questions of procedure. Meetings for the purpose of hearing evidence will take place on Jan. 4th, 1924, at 10.30 A.M., and on Jan. 7th and 8th, at the Ministry of Health, Whitehall, S.W. 1. These meetings will be open to the public and the press.

MANCHESTER HOSPITALS.—At the annual meeting of the Hospital Fund held in Manchester on Dec. 12th it was pointed out that the difference between the annual income and annual expenditure of the hospitals was £51,000, a deficit largely made up of charges upon the hospitals of patients coming from outside Manchester and the Borough of Salford. These outside patients cost £95,000, and the contributions in respect of them amounted to £44,000. Some very prosperous resorts favoured by Lancashire business men gave but meagre financial support. Manchester needed more organisation and coördinated effort if more funds were to be obtained.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH.—At the annual meeting of the College held on Dec. 6th Dr. George Lovell Gulland was elected President of the College for the ensuing year. Sir Robert Philip, Drs. J. C. Dunlop, R. A. Fleming, Robert Thin, Lamond Lackie, and Edwin Matthew were elected members of the Council, and Drs. Dunlop and Claude B. Ker as representatives of the College on the board of management of the Royal Infirmary. The other office-bearers of the College for the ensuing year are as follows: Vice-President, Dr. Dunlop; Treasurer, Sir Norman Walker; Hon. Librarian, Dr. Thin; Curator of Research Laboratory, Sir Robert Philip; Secretary, Dr. J. S. Fowler.

BETHLEM ROYAL HOSPITAL.—A course of lectures and practical instruction for the Diploma in Psychological Medicine granted by the various universities is given at Bethlem Royal Hospital twice yearly during the spring and autumn. The next course, which will begin on Jan. 14th, 1924, will conclude in April and is divided into two parts—A and B. Part A deals with the anatomy, histology, and physiology of the nervous system and psychology, and Part B consists of lectures and demonstrations of neurology, psychological medicine, and mental deficiency. Clinical instruction in psychological medicine is given at Bethlem Royal Hospital every morning (except Wednesdays) at 11 o'clock. Further particulars may be obtained from the Physician-Superintendent at the hospital, S.E. 1.

ROYAL MEDICAL BENEVOLENT FUND.—At the last meeting of the Committee 30 cases were considered, and £350 was voted to 22 applicants. The following is a summary of some of the cases relieved:—

Daughter, aged 77, of M.R.C.S. who practised at Market Drayton and died in 1878. She has been given a home and an allowance of £26 per annum for some years by a cousin who died in May last, and now she has to find other accommodation. Friends have helped her to the extent of £25 since December and she asks the Fund to give her some assistance. Voted £26 in 12 instalments.

Daughter, aged 39, of M.R.C.S. Eng. who practised near Rugby and died in 1902. Applicant has supported herself as a governess and owing to periods of unemployment has had a hard struggle to make ends meet. Her expenses during six months unemployment were about £52 and her total income amounted to about £70. She asks the Fund to give temporary assistance. Voted £10.

Widow, aged 66, of L.R.C.P.I. who practised at Worksop and died in a nursing home in Ireland in 1917. Applicant's late husband was unable to make any provision for his wife or family as he had to retire from practice owing to a mental breakdown. The son is unable to give any help and one daughter is married. The remaining daughter lives with her mother and shares expenses. Applicant had a temporary Government appointment which has now ceased, owing to ill-health. Voted £3 in two instalments as from Dec. 1st, and case to be reconsidered at the next meeting.

M.R.C.S. Eng., aged 60, who practised in Wales and through paralysis had to give up practice in 1892. Up to 1921 applicant's board, lodging, and attendance were paid out of his annuity, supplemented by friends' gifts and help from a brother. This brother retired from the Navy and is unable to give the same help. He applied to the Fund and the Committee voted £26 in 12 instalments. In 1922 this was repeated and at this meeting again renewed.

Daughter, aged 70, of M.R.C.S. Eng. who practised in the Isle of Wight and died in 1870. Owing to chronic ill-health applicant is quite unable to support herself. She lives with an old nurse and pays 3*s.* 6*d.* per week rent. Her only income is £20 from the Home for Incurables and the Old Age Pension. Voted £10 in two instalments.

Subscriptions may be sent to the hon. treasurer, Sir Charters Symonds, K.B.E., C.B., M.S., at 11, Chandos-street, Cavendish-square, London, W. 1.

THE seventh course of lectures for the Diploma in Psychological Medicine will begin at the Maudsley Hospital on Jan. 21st, 1924, under the direction of Sir Frederick Mott.

NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC.—A post-graduate course on Diseases of the Nervous System will be held from Feb. 4th to March 28th, 1924. The general course will consist of clinical lectures and demonstrations, teaching in the out-patient department, and pathological lectures and demonstrations. A course of lectures on the Anatomy and Physiology of the Nervous System will be arranged if there are sufficient applicants. A course of clinical demonstrations, chiefly on Methods of Examination of the Nervous System, will be given. A course of eight lectures and six demonstrations on Neurological Ophthalmology to a limited number of students will also be held. A certain number of students can be enrolled as ward clerks or as clinical assistants in the out-patient department. Further particulars may be obtained from the Secretary, Medical School, National Hospital for the Paralysed and Epileptic, Queen-square, London, W.C. 1.

THE LATE LORD WILLOUGHBY DE BROKE.—Lord Willoughby de Broke, nineteenth Baron, whose death occurred on Dec. 16th, besides taking a front place in politics, sport, and the arts, was always greatly interested in medicine, and especially in preventive medicine, in its relation to the reduction of venereal disease. On several occasions he raised the subject of the prevention of venereal disease in the House of Lords, and in 1919 took a leading part in launching the Society for the Prevention of Venereal Disease, accepting the Presidency of this Society, and the chairmanship of its Executive Committee. In combination with Lord Dawson and Lord Trevethin he helped to end the venereal controversy by bringing his own Society and the National Council for Combating Venereal Disease into line on the terms of the Trevethin Report, and one of his last acts, prior to his illness, was to visit Lord Trevethin with the object of discussing their proposed joint deputation to the Minister of Health. When he had formed a definite opinion as to what was the right course to pursue, he was not to be deflected from his goal, and courageously and determinedly followed his line. He earned the respect and affection of all who worked with him, and even those whose opinions differed most widely from his bore him no grudge.

THE NATIONAL HEALTH INSURANCE ACT IN THE IRISH FREE STATE.—The Irish National Health Insurance Commission made an important communication to the representatives of the Irish Medical Committee last week. Since the beginning of 1916 certification for benefits under the Act has been performed by the medical profession generally, the remuneration being provided by a special Government grant. The Minister of Finance in the Free State Government has notified the Commission of his inability to continue the grant. In the circumstances the Commission has looked round to find what funds it can make available for carrying on a necessary service. By obtaining a small contribution from the approved societies, and by calling on certain floating funds which can be put at he disposal of the Commission, sufficient moneys can be found to provide remuneration at about 3*d.* per head per insured person less than hitherto. At present, owing to an increased remuneration due to a war bonus, only part of which was taken off, the profession is paid 20 per cent. more than when the scheme was put into operation in 1916. If the profession now agrees to the reduction proposed by the Commission, the remuneration will return to a fraction above its original level. The statement of the Commission on this point was accompanied by an assurance that the offer, if agreed on, would be for one year only, and that early in 1924 the Government was to undertake an inquiry into the entire working of the National Health Insurance Acts in Ireland. Our Irish correspondent adds: It is to be hoped that such an inquiry will look into the whole question of the public medical services, without which the consideration of the question of medical benefits would be sterile. The Irish Medical Committee has not yet met to consider the communication from the National Health Insurance Commission.

THE MIDDLESEX HOSPITAL CONVERSAZIONE.

STAFF, students, and nurses of the Middlesex Hospital and Medical School were "At Home" on the evening of Dec. 18th, and so well organised was their reception of a very large number of guests, including the Prince of Wales, that all these seemed to feel at home also. The itinerary through the hospital and medical school was clearly mapped by sign-posts, and it was not advisable to move against the traffic. Section I. included the operating theatres and instrument rooms, where demonstrations of midwifery forceps appeared to have a special fascination for the general company, and the electrical and radiological departments. The anatomy and physiology departments made up Section II., while perhaps even more attractive, though apparently less frequented exhibits were available in Section III., which was reached by devious paths after passing through the other sections. In the anatomy department a series of stereoscopic photographs of dissected hearts suggested a useful means for students of revising and confirming impressions of their own dissections. Some very beautiful slides were on view in the same room. In the pathological department outstanding exhibits were those of the methods of growing an aerobic bacteria—the pathology of gas gangrene and tetanus had to be explained to a succession of enthralled listeners—and of the methods by which insulin is actually being made for hospital use. Even those who remain dubious as to the physiological value of alcohol must have been impressed by its remarkable efficiency in the laboratory, first in destroying the trypsin-secreting tissue of the ox pancreas, which is the raw material used, and at a later stage in precipitating the insulin from the concentrated watery solution to which this material has been reduced. Another exhibit was the demonstration of the treatment of boils by vaccines, in which the pus, the syringe, and the preparation of vaccines were shown, the final stage of the exhibit—and it is to be hoped of the boils—being the injection into an arm. Demonstrations of ultra-violet rays, of some newer laboratory methods of investigating disease, and of changes in the tissues in disease also received much attention. The whole impression was that of a hospital and school alive to its responsibilities alike for the care of the sick, for research, for the training of students and nurses, and, not least, for educating the public to appreciate the problems of medicine and the efforts being made for their solution.

Appointments.

BIGLAND, A. D., M.D., Ch.B. Liverp., M.R.C.P. Lond., has been appointed Honorary Assistant Physician, Liverpool Royal Infirmary.

BULMAN, M. W. B., M.S. Lond., F.R.C.S. Eng., Honorary Assistant Surgeon to the Norfolk and Norwich Hospital.

DAVIES, E. C., M.Sc. Manch., Assistant Lecturer in Chemistry at the Natal Technical College, Durban, South Africa.

HADFIELD, G., M.D. Lond., Consulting Pathologist to the Southmead Infirmary, Bristol.

HEADRIDGE, D., L.D.S., Lecturer in Dental Anatomy and Physiology, University of Manchester.

ORSMOND, E., M.R.C.S., L.R.C.P. Lond., House Physician, St. Bartholomew's Hospital.

TIBBLES, J. R., M.B., Ch.B., M.R.C.S., L.R.C.P., Resident Medical Officer, Willesden Health Department.

Salford Royal Hospital: PETERSON, N., M.B., B.S. Lond., F.R.C.S. Edin., F.R.C.S. Eng., Resident Medical Officer; GHOSH, J., F.R.C.S I., D.P.H., Anæsthetist (re-elected).

Vacancies.

For further information refer to the advertisement columns.

Bournemouth, Royal Victoria and West Hants Hospital.—Res. H.S. £150.

Chesterfield and North Derbyshire Hospital.—Res. Surg. O. and Sen. H.S. £300 and £200 respectively.

Dreadnought Hospital, Greenwich.—H.P. £150.

Exminster, Devon Mental Hospital.—Third Asst. M.O. £300.

Harefield, Middlesex County Tuberculosis Sanatorium.—Third Asst. Res. M.O. £400.

Hastings, Royal East Sussex Hospital.—Hon. S. and Hon. P.

Hospital for Sick Children, Great Ormond-street, W.C.—Biochemist. £600. Res. Med. Supt. £300.

Hull, Victoria Hospital for Sick Children, Park-street.—R.M.O. £100.

Liverpool, Royal Southern Hospital.—Hon. M.O. Electro-therapeutic, &c., Dept., and Hon. M.O. Electro-cardiographic Dept.

Loughborough and District General Hospital and Dispensary.—Res. H.S. £175.

Manchester, Northern Hospital for Women and Children, Parkplace, Cheetham Hill-road.—Sen. and Jun. H.S.'s. £150 and £100 respectively.

Manchester Royal Infirmary.—Sen. and Jun. Pathological Registrars. £100 and £50 respectively.

Middleton-in-Wharfedale Sanatorium, near Ilkley.—Asst. Res. M.O. £350.

Orkney, Parish of Eday.—M.O.

Reading, Royal Berkshire Hospital.—H.P. Also Third H.S. Each £150.

Royal Army Medical Corps.—Commissions.

St. Bartholomew's Hospital.—Radiologist. £500 to £1000.

Sunderland Royal Infirmary.—H.S. £140.

Union of South Africa, University of the Witwatersrand.—Senior Lecturer in Anatomy. £450.

West End Hospital for Nervous Diseases, 73, Welbeck-street, W.—Cas. P. £200.

The Chief Inspector of Factories, Home Office, London, S.W., announces a vacant appointment at Cockermouth, Cumberland.

The Secretary of State for the Home Department gives notice that he proposes to appoint a second Medical Referee under the Workmen's Compensation Act, 1906, for the Barrow-in-Furness and Ulverston, Kendal, Kirkby Lonsdale, and Windermere County Courts in Circuit No. 3. Application for the post should be addressed to the Private Secretary, Home Office, and should reach him not later than Jan. 5th, 1924.

Births, Marriages, and Deaths.

BIRTHS.

BATTERHAM.—On Dec. 12th, at Stone Field, Kidbrook-grove, Blackheath, the wife of Captain D. J. Batterham, R.A.M.C., of a daughter.

HODGSON-JONES.—On Dec. 8th, at St. Agnes, Caterham-on-the-Hill, the wife of Dr. R. W. Hodgson-Jones, of a daughter.

MARRIAGES.

MOLESWORTH—HOARE.—On Dec. 15th, at St. Marylebone Parish Church, Hickman Walter Lancelot Molesworth, F.R.C.S., to Caryl Margaret, daughter of Mr. and Mrs. Stanley Hoare, of Cornwall-terrace, Regent's Park, N.W.

DEATHS.

CLAPP.—On Dec. 9th, at St. Leonard-road, Exeter, George Tucker Clapp, M.B. Camb., M.R.C.S., aged 66.

GOGGIN.—On Dec. 16th, at Folkestone, George Taylor Goggin, late Colonel, R.A.M.C., aged 72.

HOLLINGS.—On Dec. 10th, after three days illness, Edwin Thomas Hollings, M.R.C.S., L.R.C.P., of Jamaica-road, London, S.E.

MARSHALL.—At 1, Douglas-crescent, Edinburgh, on Dec. 16th, Lieut.-Colonel D. G. Marshall, I.M.S. (retired).

STEPHENSON.—On Dec. 15th, at his residence, Welbeck-street, Sydney Harry Stephenson, M.B., F.R.C.S Edin., D.O. Oxf.

SWAN.—On Dec. 13th, at a nursing home, following an operation, Charles Robert John Atkin Swan, O.B.E., M.B., B.Ch. Oxf., of Chester-place, Hyde Park, aged 60.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

DONATIONS AND BEQUESTS.—By the will of the late Lieut.-Colonel Alfred Conway Bishop, the testator left £500 each to Charing Cross Hospital, the London Hospital, St. George's Hospital, the West London Hospital, and the Given-Wilson Institute, Plaistow, E.; £200 each to the East London Hospital for Children, Shadwell, St. Mary's Hospital, Plaistow, the Hospital for Sick Children, Great Ormond-street, and the London Lock Hospital.—Mrs. Margaret Dacre, of Carlisle, left £1000 each to the Cumberland Infirmary, and the Free Home for the Dying, London, for a bed in memory of her husband.

Notes, Comments, and Abstracts.

ON THE HUMANITY OF METHODS OF SLAUGHTER.

BY LEONARD HILL, M.B., F.R.S.,
DIRECTOR, DEPARTMENT OF APPLIED PHYSIOLOGY, NATIONAL INSTITUTE OF MEDICAL RESEARCH

WHILE blood is a medium in which microbes readily grow, muscle is far more resistant to their invasion; this is because each muscle fibre is not only enclosed in a homogeneous membrane, but turns acid after death. The more blood therefore left in flesh, the greater will be the tendency to putrefaction, and the less the keeping quality. Every good housewife knows that flesh left lying on a dish turns faint quickly where oozings of blood touch it; she also knows that to keep suet sweet, the lumps of fat must be broken up and freed from blood-vessels and connective tissue, and then kept dry in flour to which it gives up its moisture.

Traditional Methods of Slaughter.

Now the butchers claim that animals killed by being shot in the brain cannot be so well drained of blood and lymph as those killed by the old traditional methods. In consequence, the flesh is moister, not so firm, weeps drops of blood and serum when cut, while the fat is softer and is not so white and shows spots and streaks of blood in places. The bacon-curers also say that the carcasses of pigs killed by shooting show extravasations or "blood-splashings" which are so disfiguring that competition with the bacon and ham of animals slaughtered by the old method—that is, by cutting the big arteries in the neck and bleeding—is out of the question, and therefore their trade will be ruined if the shooting method is made compulsory. These contentions are reasonable, and have, as I shall show later, a solid basis of physiological science behind them. They are supported by the photographs of bacon splashed with blood, which were given me by a bacon-curer, and are confirmed by the results of a recent test of the various methods of slaughter conducted by the Birmingham authorities at their public abattoir. I was one of those invited to witness there the killing of oxen, sheep, and pigs by means of various safety pistols and by the old method—viz., the pole-axe for oxen and throat-cutting for oxen (Jewish method), and the latter for sheep and pigs. It is generally assumed by laymen that the shooting is much more humane than the older methods. They suppose that the cutting of the throat is a most painful operation, and that struggling movements are necessarily a sign of pain. Educated in the false ideas and statements of writers of romance they are easily led astray by agitators having no knowledge of physiological science, nor surgical experience. Now the surgeon knows that sudden big injuries are not felt at the time of their infliction. He knows, moreover, that structures beneath the skin, apart from sensory nerves, are insensitive to the knife. It is well known that men injured in battle—severely and perhaps fatally—often fight on unaware that they are wounded until they see the blood or become exhausted. At most the wounded feel a dull sensation of a blow and numbness in the injured part. Pain comes later when a wound becomes septic and inflamed. The merciful insensitiveness of man to severe injury was impressed upon me, when I was a young house surgeon, by two cases—one of a man with his pelvis crushed between the buffers of a train. Conscious, although collapsed, he was able to tell me that he had felt no pain; shortly afterwards he died of shock. A similar case was that of a man impaled by the shaft of an iron railing through falling out of a window.

Is Throat-cutting Painful?

In defending the Jewish method of slaughter from unjust attack, the distinguished surgeon, Mr. T. H. Openshaw, stated that several cases of throat-cutting, which surviving from their injury had come under his care at the London Hospital, were questioned by him. Not one of these had felt the cut when it was made. When a very sharp knife is used to cut the healthy (not inflamed) skin, very little pain is felt—even by a man who is expecting the cut—particularly so in parts, such as the back, which are not so trained to delicate sensibility as the finger-tips. Horses standing loose in a stall are bled from the jugular vein for the obtaining of antidiphtheritic serum; they continue during the operation to eat placidly at the manger. Sensitive as the horse is to the sting of a fly, or whip, or prick of a spur, it takes no notice of the cut of a sharp knife. The skin has been evolved sensitive only to those things which concern it in the natural struggle for existence, and deep structures, apart from sensory nerves, protected as they are by the skin, are wholly insensitive to touch. The touch of whip or spur is like the sting of a fly, and is therefore felt by the horse, which must protect himself against a natural enemy; on the other hand, the cut of a sharp knife is not a natural stimulus and is unfelt.

Of these facts laymen are, as a rule, wholly ignorant. As to the duration of consciousness after the cutting of the throat, I can cite an experiment made by myself some years ago when, together with Mr. Openshaw, I defended the Jewish method of slaughter. I anæsthetised a calf and inserted a tube in the peripheral end of the cartoid artery—that is, in the end connected with the arteries supplying the brain. It must be borne in mind that the vertebral arteries do not also supply the brain of cattle but end in the muscles of the head. The tube placed in the artery was filled with a strong saline solution to prevent clotting of the blood, and connected with a mercurial manometer arranged so as to record (on a revolving drum) the blood pressure. The animal's neck was then cut with a sharp knife so as to divide the great blood-vessels at one stroke. The manometer recorded an instant fall of blood pressure which reached zero in a second or two, showing that the circulation in the great brain had ceased. Now we know by human experience that such sudden cessation of the circulation by depriving the brain of oxygen instantly abolishes consciousness, whether produced by pressure on the brain or by heart failure, or by occlusion of the great blood-vessels of the neck. An old medical writer tells of a beggar in Paris who had a large hole in his skull covered with skin. He sat in the street and for a coin allowed a person to press upon his brain, when he fell asleep. The moment the pressure was withdrawn he became conscious again. The very word carotid betokens sleep. Mountebanks used to compress these arteries in a goat and make the animal fall down unconscious or spring up again at their will. The garrotter by compressing these arteries by a grip from behind rendered his victim unconscious while he robbed him of his watch and money. A schoolboy playing at hanging has lost consciousness through the sudden compression of these arteries and has died in consequence. This unhappy accident has been repeated through a general ignorance of the danger.

Adventitious Factors.

Two facts are, then, indisputably established: (1) that a big injury, such as throat-cutting, is not felt at the moment of infliction; (2) that the cutting of the big arteries in the throat instantly arrests the circulation in the great brain and abolishes consciousness. The actual operation of cutting the throat is, then, as humane as shooting with the safety pistol, or stunning with the pole-axe. Each of the last two methods requires the correct application to the skull of the weapon, and either may fail in a restive animal which happens to swerve at the critical moment. The cutting of the throat requires the casting of oxen and sheep and the holding of pigs or hoisting in the head-down position, but it cannot fail. Any charge of inhumanity can therefore be made justly not against the cutting of the throat, but only against the operation of casting, or hoisting. Now sheep are carried in and cast on their backs on a table whether for shooting or throat-cutting, so any such charge fails in regard to sheep. Oxen, by the Jewish method, are cast by a tackle fastened to their feet and to a hoist. Pigs have a tackle fastened to one hind leg and to a hoist. If both legs were fastened the animals would be able to jerk themselves up and down. At Birmingham an electric motor was used to both hoist and transfer each pig from the pen to the slaughterer. Nine pigs were thus slaughtered in a space of a little over five minutes. At a big bacon-curing factory pigs are slaughtered far more quickly than this—e.g., at the rate even of ten a minute. On the other hand, a minute or two were spent at the Birmingham tests by the operator manœuvring round each pig, free in a pen, in order to get the pistol in the proper position for shooting, and there was some risk to the operator and much skill required of him. He was an intelligent official, highly trained in the use of the pistol. The pigs may struggle violently after shooting, convulsed by the damage done to the brain. In one case the convulsions were so violent that the throat could not be cut for about three minutes after the shot had been fired. The time spent in shooting pigs is, then, much greater than that spent in cutting the throats of an equal number. So, too, in the case of sheep, shooting requires two operations in place of one, a serious matter when some hundreds of sheep are killed in one day; it also requires two men when one suffices to hold and cut the throat. Shooting means, then, dearer meat.

Animals, whatever be the method of slaughter, have to be driven to market and pushed, pulled, poked, and tail-twisted by drovers in order to make them go first into the pens outside and then into the slaughter-house itself. By

no means can they escape some measure of rough handling. Casting of oxen or hoisting of pigs entails, in my judgment, handling which is no more inhumane than the rest. Conducted skilfully and with electrically-driven hoists these operations may occupy no more or even less time than that spent in forcing and roping an animal into position for shooting. In casting an ox by the Jewish method a mattress is used. Mr. Openshaw found no evidence of bruising post mortem; it is obviously not to the advantage of the butcher to bruise the meat and cause extravasation of blood in the carcass. The butcher asserts that the more gently beasts are handled and the less driven the more tender the flesh. It is obvious that it is a disadvantage to exhaust the muscles and produce excess of lactic acid in them. A hunted animal at once goes into rigor mortis after death, and its flesh is tough.

The Consciousness of Animals.

It must be borne in mind that animals have no more consciousness of death than uneducated babies have. Man's recognition of the hideousness and horror of the slaughter-house is the result of education. It is absurd to think—as sentimental people do think—that animals are conscious of the presence of a dead carcass, or spilt blood. Careful observation has convinced me—as it will any level-headed man—that animals in an abattoir are nervous of moving men, of drovers with their pushing, pulling, and tail-twisting, but so soon as they are left alone they become placid and indifferent to the sights about them. Pigs are naturally disturbed by the squeals of other pigs when caught and pulled from their pen, but no more so than when they are caught for the operation of nose-ringing. Whatever suffering there may be is separable from the actual operation of slaughter, and occurs in the process of driving the beast to and putting it into position for slaughter. Whether an animal is pushed, pulled, and tail-twisted into the right position for the pistol, or cast or hoist into the posture necessary for throat-cutting, appears to me, then, a matter of very small moment. As the result of human experience we must conclude that a cast or hoist animal will be so hypnotised by the unusual position into which it is suddenly put, that it will be able to take no further notice of anything going on around it. The layman must recognise that while an animal with its throat cut continues to breathe and move convulsively for some minutes, these convulsive movements are not signs of consciousness. The shot beast may be convulsed for no less a time. Such convulsions are due to acute anæmia of the power parts of the nervous system. Observation has shown me that the movements of the eyes of an ox become convulsed within a very few seconds of throat-cutting, a sure sign of the acute anæmia and dying state of the centres in the mid-brain. The great brain, where sits consciousness enthroned, ceases to function at once, the mid-brain next, the spinal bulb next, and last, the centres of the spinal cord.

It has been a custom of certain African savages, after decapitation of an enemy, at once to close the blood-vessels of the neck with a cautery, and then amuse themselves by exciting reflex movements in the corpse. No doubt the savage thinks his enemy feels his insults. It is well known that even movements of locomotion can take place in a lower animal the great brain of which has been destroyed. Thus, a fowl, after decapitation, runs round before it falls over. When from an anæsthetised cat the great brain is removed without loss of blood the body continues to carry on its functions, including respiration, and these functions may be studied by the physiologist for many hours. Nay, if the body of the animal is kept in a warm bath even for several days. The layman must discard his crude idea that movement betokens consciousness before he can form any just view of the humanity or inhumanity of a method of slaughter.

The Flesh of Shot Animals.

I now return to the contention of the butchers that the flesh of shot animals is moister and contains more blood. This was clearly shown by the Birmingham tests. Half carcasses of selected and representative animals killed by each method were reserved in a locked-up store and examined a week later. On cutting up the carcasses and comparing the flesh of the shot oxen with that of the ox killed by the Jewish method, it was clear that the flesh of the latter was firmer, drier, and free from blood. The flesh of the shot carcasses not only was moister and softer, but showed blood in the vessels. The flesh of the pole-axed ox appeared to me somewhat drier and freer from blood than that of the shot animals, but there was no striking difference. When the throat is cut by the Jewish method the centres in the lower parts of the nervous system—viz., the spinal bulb and cord—continue to act for a time. Deep, gasping respirations occur, and convulsive movements which press the blood out of the muscles and organs of the belly. The vaso-motor centre in the spinal bulb is excited by the acute anæmia and causes constriction of the arteries all over the body, the heart is accelerated in action, and the bowels undergo peristaltic movements which wring out the blood. The whole of these actions result in almost complete drainage of blood and tissue-lymph out of the body. When an animal is shot the slaughterers cut the throat—this after some period of delay—and then, respiration having stopped, try to imitate its effect by rocking the body with their feet. The bullet by explosive action may set up increased pressure in the skull, and so stimulate the inhibitory centre of the heart which lies in the spinal bulb, and thus temporarily stop the action of the heart. This is a well-known result of increasing the pressure within the skull, and was shown to occur by the late Sir Victor Horsley when a bullet was fired into the skull. By pole-axing the skull is opened, and it is therefore unlikely that inhibition of the heart should result. After the shooting or pole-axing of an ox the lower nerve centres may be, and generally are, destroyed by the insertion of a can or wire. This destroys the vaso-motor centre and relaxes the muscles. The blood by either of these methods cannot, therefore, be emptied out from the body so well as it is by the Jewish method.

When the brain of a small mammal is destroyed, as it can be instantly by the passage of a bradawl through the foramen magnum into the skull, it occasionally happens that the physiologist cannot keep the body alive by artificial respiration for the study of its functions. He then finds a clot formed in the right auricle of the heart It is probable that some damaged tissue—e.g., small fragments of bone—is in these cases carried from the venous sinuses of the brain to the heart, and there set up clotting. Such clotting would be more likely to happen in a shot than in a pole-axed animal; if a clot forms in the heart bleeding is impeded.

Drawbacks of Pistol and Pole-axe.

It is clear, then, that the Jewish method of killing oxen is the best for draining an animal of blood. In Colombo, Ceylon, cattle are killed by throat-cutting after they have been fastened to tackle, whereby they are tilted into the head-down position so that the drainage of blood is complete. The machine carries the carcass on to the flayers, &c. By such means cattle can be killed, flayed, and cut up with great rapidity. Properly carried out, no better or more humane method can be devised. The pole-axe is not a certain method in the case of restive animals and in the hands of inexperienced slaughterers. The blow of the axe may sometimes miss the small area of the skull—about the size of a breakfast cup—which has to be struck. Missing this the pole-axe goes into the air spaces within the thick wall of the skull, and does not stun the animal. At Birmingham, in one case, the first blow brought the ox to its knees, but did not penetrate deeply enough to allow the cane to be used. It was then repeated. The long-armed pistol-killer of the R.S.P.C.A. appears to be a surer method of killing oxen. As in the matter of bleeding, the results of these two methods are not very dissimilar, the choice for oxen would then be with the pistol rather than the pole-axe. The free bullet is, however, not safe to use in slaughter-houses, and while the captive bullet is safe, it is difficult to use on restive or wild animals. An excellent method of slaughtering oxen is in use in Australia. Driven up an inclined path each comes finally to a small narrow enclosure with a window at the end. The ox lifts his head to look over, and a man standing above with a hammer at this moment stuns it. The ox falls, and is then carried down to the slaughter-house where it is hung up and bled. Breathing continues after stunning, so that bleeding is efficiently carried out. An ineffectual attempt to stun a pig with a hammer was made at Birmingham.

In the case of pigs, by fastening the animal head down and cutting the big arteries in the neck, blood and tissue and lymph are drained out by gravity, by convulsive respirations, and by general convulsive movements. When an animal is so bled, lymph passes from the tissues into the capillaries and veins in the effort of the body to keep up an effective circulation. The carcass of the pig thus bled, selected at Birmingham, showed firm dry flesh and firm white fat, and no blood could be squeezed out of the intercostal veins by running the finger along these. The shot pigs fell on the floor and were more or less convulsed; in one case the convulsions delayed for three minutes the cutting of the throat. The effect of gasping respirations and gravity did not come into play. Hence the carcasses of the shot pigs showed moister flesh, pinker fat with blood in the vessels, and here and there small extravasations. It is obvious that such carcasses will keep less well and also be less fit for curing. The bacon curers say that the pig after shooting often falls with the hind feet so extended that the veins are ruptured, and large extravasations caused which make the hams useless for curing.

I took away the blade bone with some of the muscles attached to it from each one of the selected pigs. I placed a little of the muscle, taken from a similar part in every case, on a glass slide, flattened it out with a cover-slip and examined

it under the microscope, using a low power. Blood was then seen here and there in the small blood-vessels and capillaries in the muscle and fat of each of the shot pigs. The muscle and fat of the pig bled in the ordinary manner, on the other hand, showed very little blood. The difference was clear also in sections of hardened and stained muscle. From the shot pigs, and one bled in the old way, I took 2 g. of flesh cut from the same part and minced it in each case in 20 c.cm. of water, and then froze and thawed the mince so as to break up the tissue and set the colour free. The coloured solution was then filtered. That of the pig bled in the old way appeared pale; that of one of the shot pigs was pinker; that of the other quite a deep pink. I examined each solution with the spectroscope and found hæmoglobin present. I then found how much water had to be added to each to make the characteristic bands of hæmoglobin almost disappear. Taking 3 c.cm. in each case I had to add 9 c.cm. of water, in the case of the pig bled in the old way 16 c.cm. in the case of one, and no less than 25 c.cm. in the case of the other shot pig. These results confirm what the naked eye observed, and the microscope showed; the muscle of the shot animals contained more blood.

Conclusion.

The butchers and bacon-curers are then right in their contention, and on the grounds of humanity, economy, and proper carrying out of a great business they should not be prevented from continuing the old methods of slaughter. These methods have been found right through ages of human experience. It is clear that bleeding is most rapid and complete in the head-down position, and I would urge that all pigs are killed in this position. A pulley and tackle can be used in any village. If a pig is stuck while standing up, bleeding cannot be so free or loss of consciousness so immediate. A chemist in the leather trade tells me that the quality of leather is lowered by the presence of blood in the hide; not only is the leather coloured by the blood, but suppleness is diminished. This is another point in favour of the method which secures most efficient bleeding.

QUO VADIMUS?

THE sustained interest taken by the general public in the course of nine public lectures just concluded by Prof. A. Dendy, F.R.S., on the Biological Foundations of Society is symptomatic of an age that is tending more and more closely to follow the progress of science. Among his audience was a very considerable sprinkling of clergy, and fitly enough, because the culmination of the lectures was a speculation from the zoological standpoint on the latter end of modern civilisation. The underlying basis was no new one. Individual species and civilisations have so far all followed the common trail—birth, youth, maturity, old age, death, a summary in fact of Shakespeare's seven ages, but Prof. Dendy examined whether there might not be a way out. There were, he argued, six problems urgently awaiting solution if modern civilisation was to escape the fate of its predecessors. The physical environment had to be ameliorated, the system of education had to be remodelled, the population controlled, the race improved by selection, the social organisation altered for the better, and the relations between the nations placed on a sounder footing. The most novel of the suggestions was that based on the view that man had to some extent superseded his physical by his mental environment, with the result that a vastly increased importance has been given to his mental images and emotions, and that this new mental environment now leads the way in progressive evolution, just as the physical environment did in the lower stages. On mental grounds, therefore, he advocated country life for early education and development, and for later education insisted on the importance of fostering ideas that were beneficial to mental and moral development, and repressing if not eradicating those of an opposite tendency. In dealing with the control of population he strenuously opposed teaching the masses of the people to restrict their families by means that seemed to strike at the very roots of self-respect and decency, and preferred the alternative solutions of a return to the land or emigration. For selection of the human race he looked to the progress of individual ideals rather than to any self-conscious State scheme, while warmly approving the policy of preventing the propagation of the feeble-minded. In discussing international relations he held that in view of the absence of physiological barriers and the breaking down of geographical barriers there should be erected strong moral barriers to prevent indiscriminate breeding, looking forward to the time when by division of labour each nation should coöperate in the interests of humanity as a whole. His concluding note was optimistic, to the effect that if modern civilisation should fail there was much in it of permanent value that would survive and serve as a foundation upon which future generations might build a more noble edifice.

A NEW CANCER CURE.

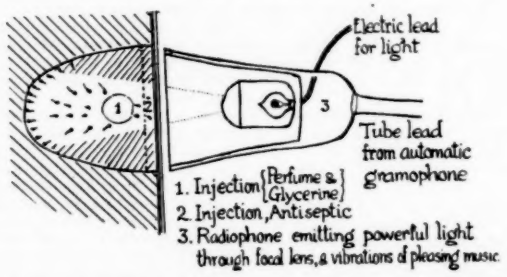
WE have received from the Director of the Imperial Cancer Research Fund the following account of a proposed treatment for cancer as submitted to him for publication. The document appended is exactly as it was received.

TREATMENT FOR CANCER.

Devised by Garnet B. Fawcett, A.R.A.S., Professor of Astrology, Aqualogy, Physiology, Dietics, Hygiene, etc., etc., etc.

Points to Remember.—(1) The germ is the equal of a serpent: (2) Serpents can be Charmed, Attracted, or Diverted by (3) Perfume, Sweets, Music, Light.

Treatment.—Diet and Salt the Body to give all the resistance possible to the germ. Inject to nearly the center a quantity of Glycerine impregnated with a powerful *Natural Perfume* (not Synthetic) (see No. 1 in Sketch). Then just beneath the Skin inject a powerful non-irritant Antiseptic (see No. 2 in Sketch). Then apply the Radiophone (see No. 3 in Sketch).


Electric lead for light
1
2
3
Tube lead from automatic gramophone
1. Injection {Perfume & Glycerine}
2. Injection, Antiseptic
3. Radiophone emitting powerful light through focal lens, & vibrations of pleasing music

Action of Treatment.—The germ being held in check with the increased Salts in the body, will change its course and seek the Perfume and Glycerine, afterwards it will seek the Light and Music from the Radiophone and fall into the Antiseptic waiting for it. This treatment should be continued until the organism is exhausted of the germ, building up the Flesh behind it until the organism itself is ejected.

We agree that the cure presents distinctive features which make it unique among the many hundreds of suggestions which are submitted to the Imperial Cancer Research Fund for consideration.

WRIGHT'S IMPROVED PHYSICIANS' AND SURGEONS' VISITING LIST, 1924.

THIS list is now in its thirty-first year. The compiler, Dr. Robert Simpson, seems to have taken for his motto "Economy in space and time," for in a small compass—the book measures 7¼ by 4 by ¼ inch—is compressed a vast amount of useful information: diary, postal regulations, utero-gestation and posological tables, average heights and weights, poisons and antidotes, facts concerning the principal zymotic diseases, and so forth, while an ingeniously constructed visiting list enables the patient's name to be entered monthly instead of weekly, and the consultant's record enables him to see at a glance the date and hour of his appointment, together with the name of the medical man in attendance. In the visiting list one month is shown at an opening with space for receipts and payments. The obstetrical and vaccination engagement sections are equally well arranged, and space is also provided for motor-car expenses and memoranda. Well bound and printed on good paper, with a pencil within the flap of the cover, this list is ruled for from 40 to 240 patients, and the price varies from 10*s.* 6*d.* to 13*s.* A copy will be sent to any member of the medical profession on approval by the publishers, Messrs. John Wright and Sons, Ltd., Bristol.

Medical Diary.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

THURSDAY, Dec. 27th.—10 A.M., Dr. Grainger Stewart: Neurological Dept. 12 noon, Mr. Simmonds: Demonstration of Fractures. 2 P.M., Dr. Scott Pinchin: Medical Out-patients.

FRIDAY.—10 A.M., Dr. Drummond Robinson: Gynæcological Operations. 2 P.M., Mr. Sinclair: Surgical Out-patients. 2 P.M., Mr. Banks-Davis: Throat, Nose, and Ear Dept.

SATURDAY.—9.30 A.M., Dr. Burnford: Bacterial Therapy. Dr. Saunders: Medical Diseases of Children. 10 A.M., Mr. Banks-Davis: Operations on Throat, Nose, and Ear.

Daily, 10 A.M. to 6 P.M., Saturdays, 10 A.M. to 1 P.M., In-patients, Out-patients, Operations, Special Departments.